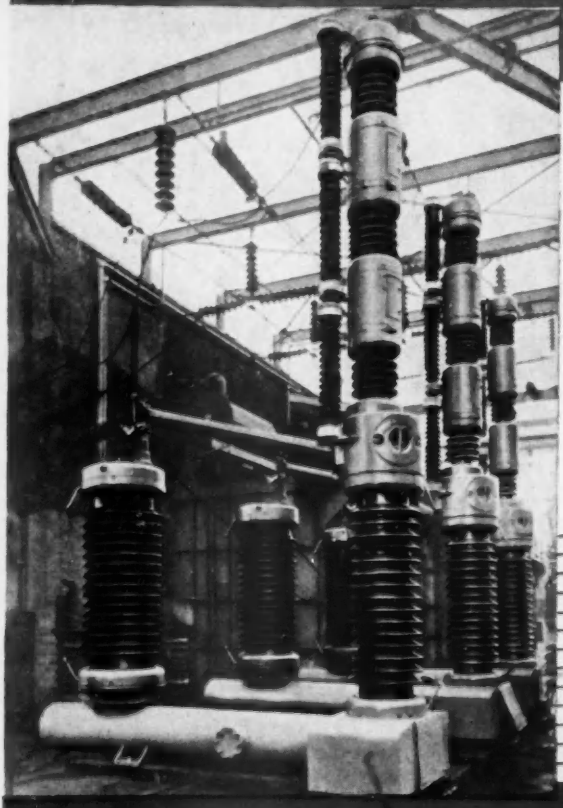
ELECTRICAL TIMES

THURSDAY
28 SEPT.
1950
SIXPENCE

ENGLISH ELECTRIC



E.H.V. AIR-BLAST CIRCUIT-BREAKERS

BUILT UP ON PRINCIPLES OF UNIT INTERRUPTERS FOR VOLTAGES UP TO 275-kV

Illustration shows 3-Interrupter Breaker for 165-kV, 600-amp, 3500-MVA on Short-circuit Test

The ENGLISH ELECTRIC Company Ltd.

SWITCHGEAR DEPARTMENT - - - STAFFORD

See also 'English Electric' Fuse gear advertisement, page 29

THIS IS THE

Reflecto-flood

OPEN TYPE FLOODLIGHT

QUICK DELIVERY

Designed for illumination of large open spaces, such as docks, car parks and railway yards, the Simplex Reflecto-Flood casts a powerful light in a forward and downward direction. This combined horizontal-vertical illumination from one lighting unit can be supplemented if necessary by an additional concentrated beam from a reflector behind the lamp. Connecting and fixing are very simple, and the Reflecto-flood is completely weather-proof

MADE BY THE HOUSE OF **Simplex**

Simplex Electric Company Limited
Oldbury Birmingham and Branches

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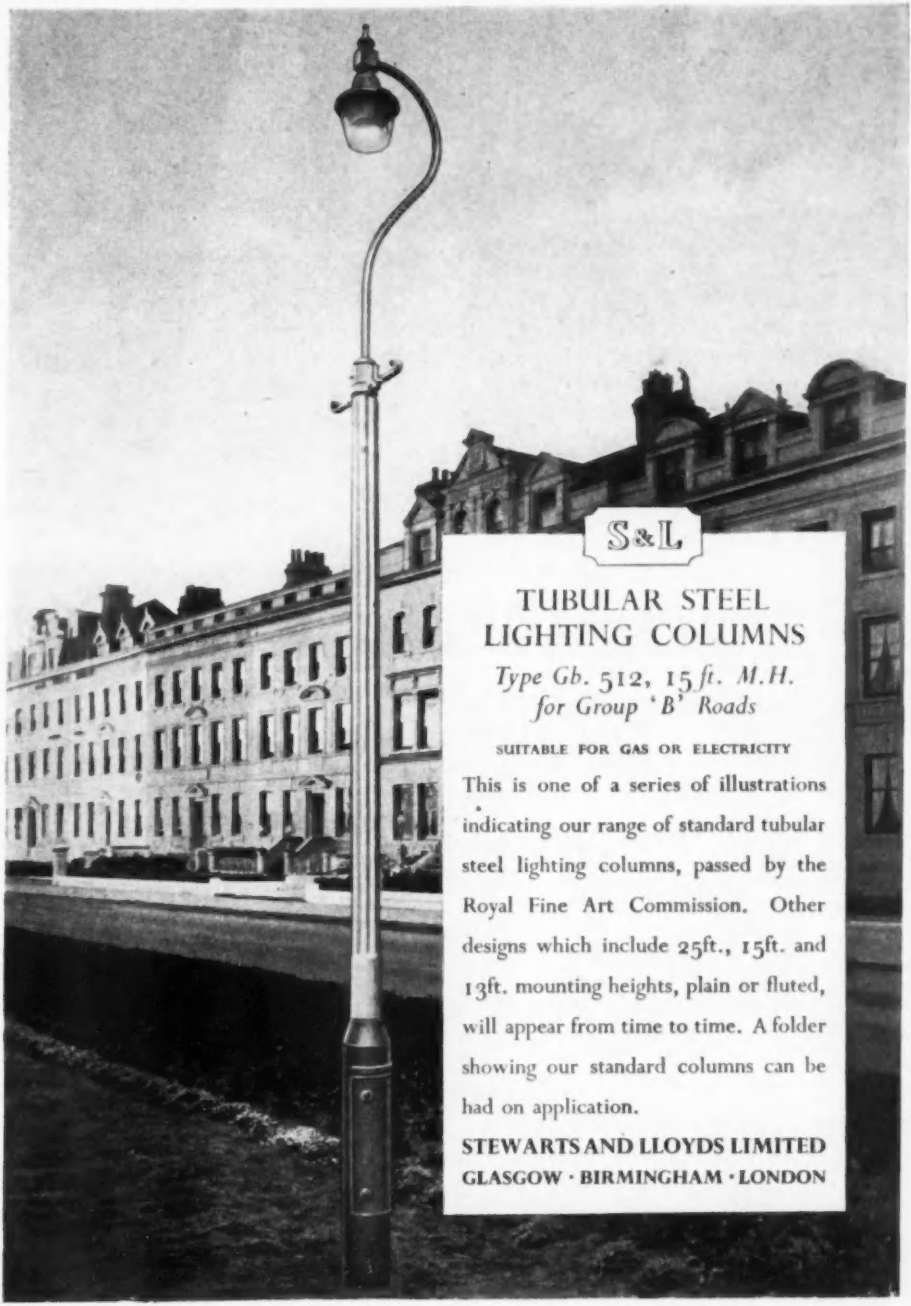
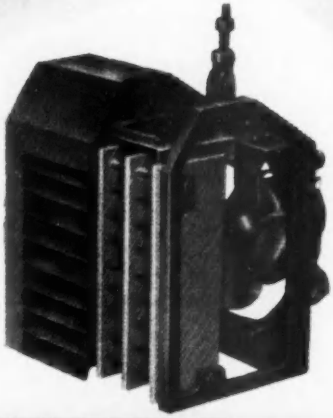

S&L
TUBULAR STEEL
LIGHTING COLUMNS
Type Gb. 512, 15ft. M.H.
for Group 'B' Roads
SUITABLE FOR GAS OR ELECTRICITY
This is one of a series of illustrations indicating our range of standard tubular steel lighting columns, passed by the Royal Fine Art Commission. Other designs which include 25ft., 15ft. and 13ft. mounting heights, plain or fluted, will appear from time to time. A folder showing our standard columns can be had on application.
STEWARTS AND LLOYDS LIMITED
GLASGOW · BIRMINGHAM · LONDON

UNIT HEATERS

Made in 3 sizes 3, 5 and 10 K.w.

- ALL ELECTRIC
- SIMPLE TO INSTAL
- ECONOMICAL TO RUN
- AUTOMATIC CONTROL
- REFRESHING ATMOSPHERE IN SUMMER
- AUGMENTS EXISTING HEATING SYSTEMS
- MINIMUM OF MAINTENANCE



SEND FOR LIST 57

CARTER & COMPANY (NELSON) LTD.

NELSON LANCASHIRE TELEPHONE 638

QUALITY PRODUCTS

Send for Folder Covering Range

Made in Britain

SOLD THE WORLD OVER

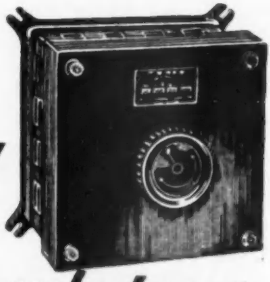
B. & H. (NOTTM.) LTD.

POPHAM STREET, NOTTINGHAM

Telephone 43826 Telegrams: "VOLTS" Nottm.

London Office: 47-49 CALEDONIAN RD., LONDON, N.1

Shunt Field Regulators



For Motors, Generators and Alternators. Also as Series Regulators for voltage, heat and speed control. We shall be pleased to send full particulars and prices on request. And remember, the advice of Cressall Technicians is always available.

CRESSALL

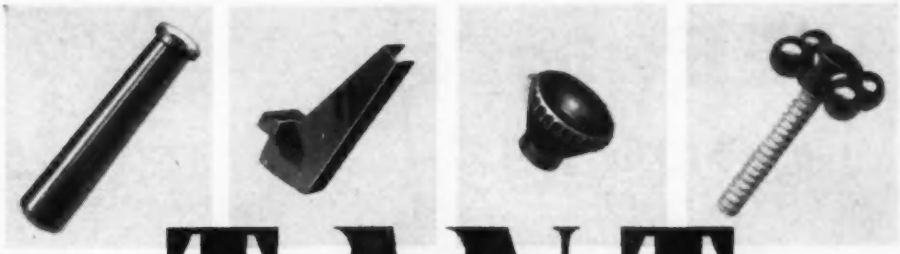
Registered Trade Name of

THE CRESSALL MANUFACTURING CO., LTD.

Tower Street, Birmingham 19.

Telephone: ASTon Cross 2666 (3 lines).

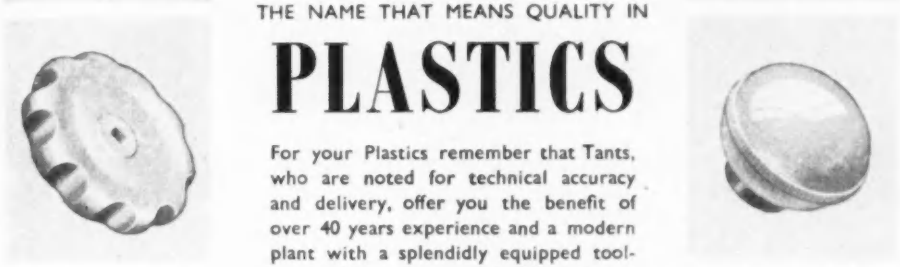
Telegrams: " OHMIC," Birmingham.



TANT

THE NAME THAT MEANS QUALITY IN

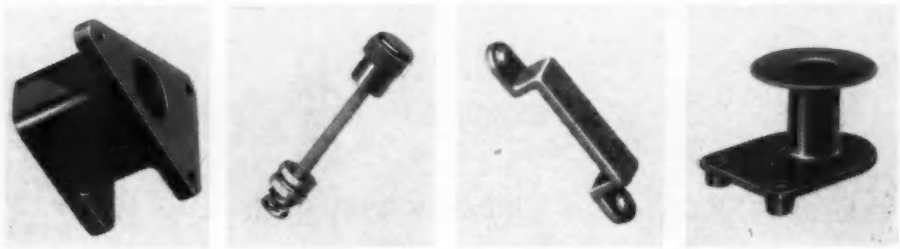
PLASTICS



For your Plastics remember that Tants, who are noted for technical accuracy and delivery, offer you the benefit of over 40 years experience and a modern plant with a splendidly equipped tool-room. No subject or problem is too difficult for them.

W. H. TANT & CO. LTD.
PIONEER PLASTIC HOUSE
TRANSANT WORKS, DOLLMAN STREET,
BIRMINGHAM 7

Telephone: ASTON CROSS 3232/3
Telegrams: "TANTAMOUNT B'HAM"



SEE what's COOKING

The glass door is just one of the many good points of the latest Belling 46/47 Cookers. The sparkling finish and smart lines charm the housewife, and she loves the really large oven, so easy to keep clean as well. The engineer likes its construction (cast hob and front, of course), and E.D.A. Specification throughout makes it easy to service — not that it is often needed.

Our National Advertising Campaign in the daily and weekly press will help to make sales easier still.

47AB, 8" and 6½" boiling plates, grill boiler, glass door . . .	£28 . 17 . 6
47A without glass door	£26 . 17 . 6
46AB, 8" boiling plate, grill boiler, glass door	£26 . 5 . 0
46A without glass door	£24 . 5 . 0

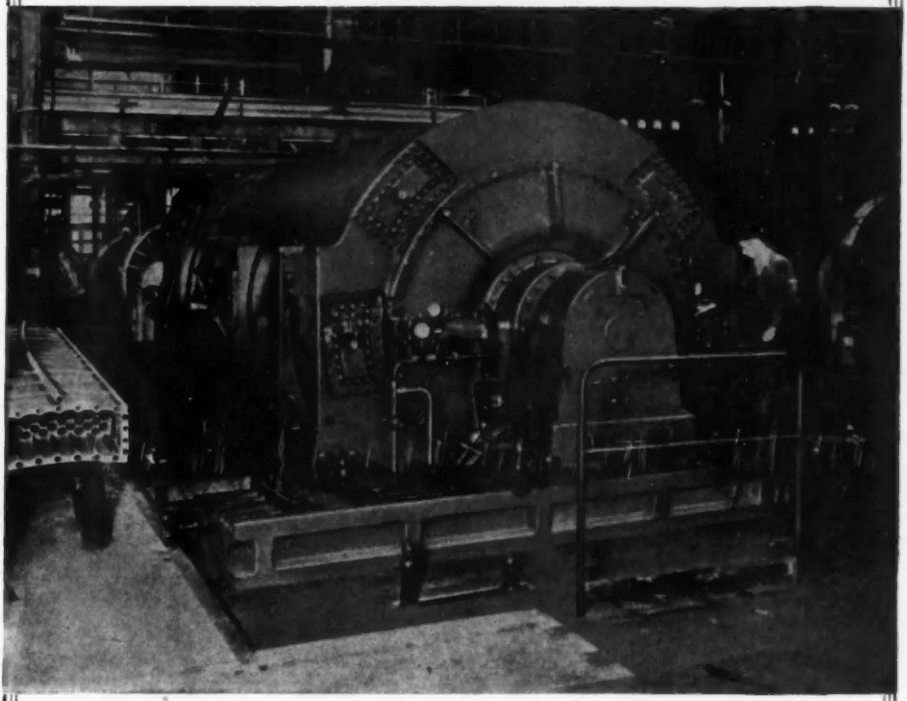
Drawer 20/-. Cream finish 10/-. Simmerstat 15/6. Radiant Plate 23/6

You can't beat a 'Belling'

BELLING & CO., LTD. · BRIDGE WORKS · ENFIELD · MIDDX.

CRC 3558

WAKEFIELD OIL FOR INDUSTRY

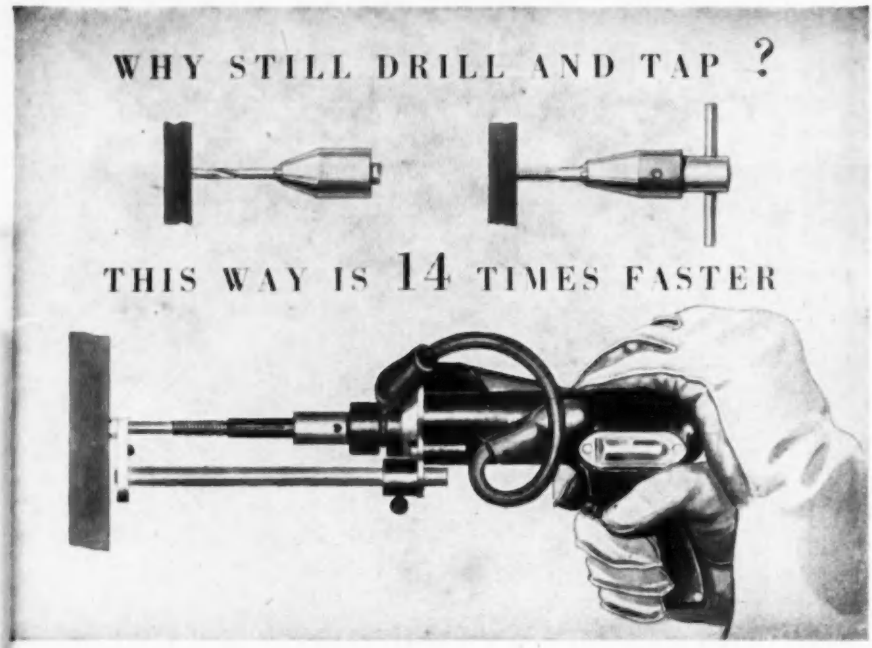


The first hydrogen-cooled turbo-alternator to be permanently installed in Europe, the 60,000 kW Metropolitan Vickers set at the Littlebrook Station. Lubricated with Wakefield Perfecto Special X

British Electricity Authority use

C. C. WAKEFIELD AND COMPANY LIMITED · LONDON · W.1

B



Let the Nelson stud welder fix your studs to steel with engineering precision. The easy-to-handle Nelson gun is almost entirely automatic. At the press of a trigger it completes a split-second automatic welding cycle, which ensures a perfect weld every time. There are Nelson studs to do hundreds of different fixing jobs and show substantial savings over bolts, pins and rivets. Find out how this versatile fixing tool can help you. Write for the Nelson brochure today.

5 points about Nelson Stud Welding

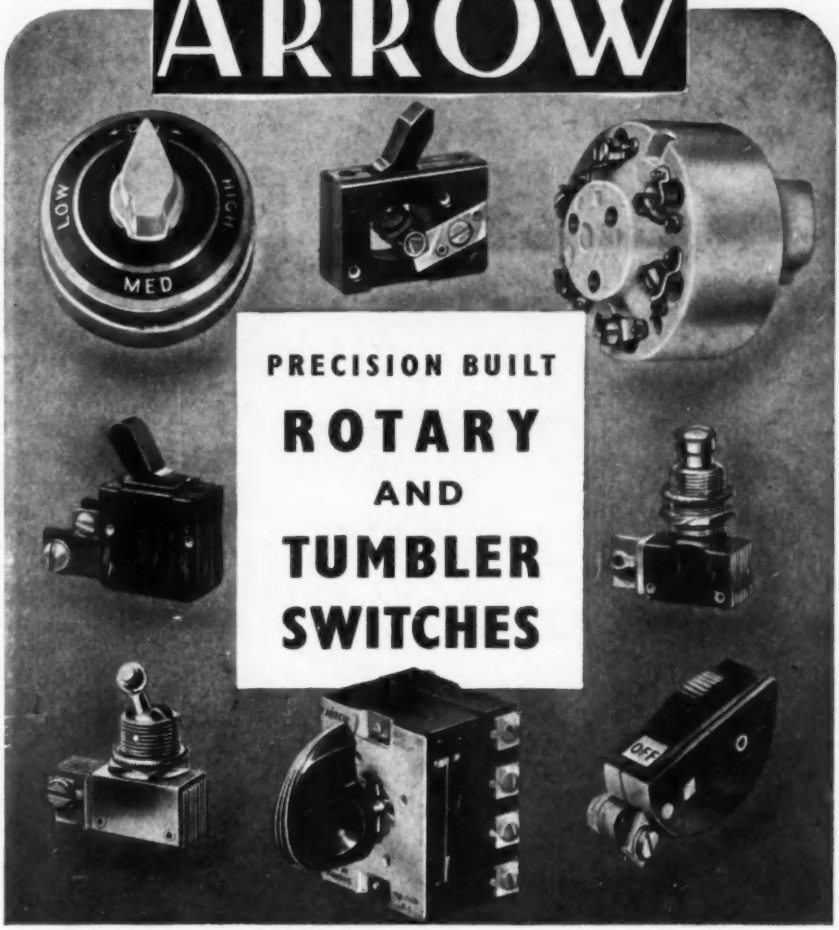
- Easy to operate—just load the gun, place in position and press trigger switch.
- No perforation of parent metal. You can use Nelson studs on vessels such as transformer tanks without impairing gas or oil-tight properties.
- Nelson studs are designed specially to ensure consistently good welds. They are made from carefully selected steel and are end-loaded with special flux.
- Nelson ceramic ferrules, supplied with the studs, localise the arc and ensure perfect fusion at point of weld.
- Complete equipment comprises Nelson Gun, Automatic Timer and D.C. Welding Generator.

Send for full facts today

NELSON
STUD WELDING SERVICE

CROMPTON PARKINSON LIMITED
CROMPTON HOUSE, ALDWYCH, LONDON, W.C.2

ARROW



The Arrow organisation has specialised for more than fifty years in the design and manufacture of switches for the control of domestic and industrial apparatus.

Rotary switches are available in many circuit combinations from 5 to 35 amps. 250 volts. Tumbler switch sizes are from 1 to 60 amps. 250 volts and are specially suitable for small motor control and electronic equipment. The small tumbler switches are specially suitable for the control of all types of fractional horse power motors.

ARROW ELECTRIC SWITCHES LTD

HANGER LANE · EALING . LONDON · W.5

Telephone: PERIVALE 4451

ROTARY SWITCHES · TUMBLER SWITCHES · MOTOR CONTROL SWITCHES

HIGGS MOTORS
TRADE MARK
BIRMINGHAM 6 ENGLAND

HIGGS FRACTIONAL H.P. MOTORS

Our comprehensive range of split-phase, capacitor start, repulsion-induction, etc., is fully detailed in Leaflet 102. Specify the motor that is

GUARANTEED FOR EVER

Belfast, Birmingham, Bristol, Dundee, Glasgow, London, Manchester, Newcastle, Peterborough, Sheffield, Wolverhampton

AVO
REGD TRADE MARK

Precision
ELECTRICAL TESTING INSTRUMENTS

The H.R. AVOMETER

PRICE
£19 : 10s.

Size: 8¼" × 7¼" × 5¼"
Weight: 6½ lb.

This recently developed High Resistance AvoMeter has a sensitivity of **20,000 ohms per volt** on the D.C. voltage ranges and 1,000 ohms per volt on the A.C. ranges.

It is a compact and portable multi-range instrument, having many advantages which will commend it for use in laboratory or workshop. A 5-inch clearly marked scale with an anti-parallax mirror is used for the following ranges of readings :

D.C. CURRENT: 50μA to 1,000 mA.
D.C. VOLTAGE: 2.5 volts to 2,500 volts.
A.C. VOLTAGE: 10 volts to 2,500 volts.
RESISTANCE:
Model 1: 0.1 ohm to 5 megohms.
Model 2: 0.1 ohm to 20 megohms.

The instrument can be supplied, if required, fitted with magnetic screening for protection against stray magnetic fields. It will stand up to heavy overload and is protected by an automatic cut-out.

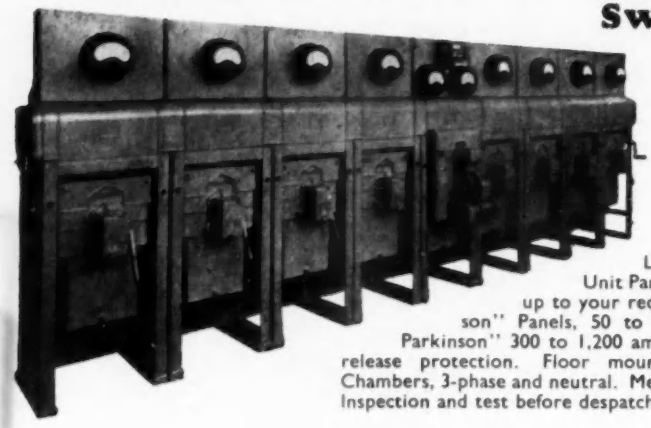
In addition to its multi-range facilities it can be used as a Galvanometer, for which purpose the zero can be offset to the extent of 30 per cent. of full-scale deflection by a simple knob adjustment.

Sole Proprietors and Manufacturers :

The AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO. LTD.
WINDER HOUSE • DOUGLAS STREET • LONDON • S.W.1 *Telephone: VICTORIA 3404/9*

H.R.I.

L.T. Oil Immersed 3 Phase Unit Panels or Switchboards



Built to your requirements

PROMPT DELIVERY

L.T. Oil Immersed 3-phase Unit Panels or Switchboards, built up to your requirements, from 18 "Ellison" Panels, 50 to 700 amp; 9 "Crompton Parkinson" 300 to 1,200 amp. Overload and no-volt release protection. Floor mounting standards. Busbar Chambers, 3-phase and neutral. Meters. Modern equipment. Inspection and test before despatch.

SLATERS ELECTRICALS LIMITED

Head Office and Works:
PRINCES WAY · TEAM VALLEY ESTATE
GATESHEAD 11 · COUNTY DURHAM
TELEPHONE 76270 LOW FELL

ELECTRICAL AND MECHANICAL ENGINEERS

MAKE WAY

for the METWAY ELECTRIC KETTLE

Yesterday's Dream realised To-day!

- ★ Fitted with the famous "METWAY" Immersion Element.
- ★ Heavy gauge Polished Aluminium.
- ★ Heatproof Insulated Handle.
- ★ Three Insulated Feet.
- ★ Capacity 4 pints.
- ★ Complete with detachable Earthed Connector with 6 ft. 3-core flexible.

NON-AUTOMATIC TYPE

List No.	*Watts*	*Retail Price*
DA/N 1000	1000	37/- each
DA/N 1250	1250	37/9 ,,
DA/N 1500	1500	39/- ,,

AUTOMATIC TYPE

DA/A 1000	1000	41/- each
DA/A 1250	1250	42/- ,,
DA/A 1500	1500	43/- ,,

All suitable for A.C. and D.C.

Write for List AL1/27 "T.E." for full details

METWAY ELECTRICAL INDUSTRIES LTD.

KING STREET, BRIGHTON 1, SUSSEX
Phone: Brighton 28366 (7 lines)

Rolling Mill Equipment

by

B
T-H

IN ROGERSTONE WORKS

(MESSRS. NORTHERN ALUMINIUM CO., LTD.)

More than nine-tenths of the electric equipment driving the *NEW* Hot-line mills, Cold-strip mills and Processing lines was manufactured by BTH

Equipment includes the following D.C. Motors:—

New Hot-line mills:—

No. 1 Reversing	one 2,000 H.P.
No. 2 Reversing	one 1,625 H.P.
Continuous	one 3,000 H.P.
	one 2,600 H.P.

Tandem Cold-strip mill:—

Three Main Stands	three 2,600 H.P.
Tension Reel	one 800 H.P.

Temper mill:—

Main Stand	one 1,000 H.P.
Two Tension Reels	two 220 H.P.

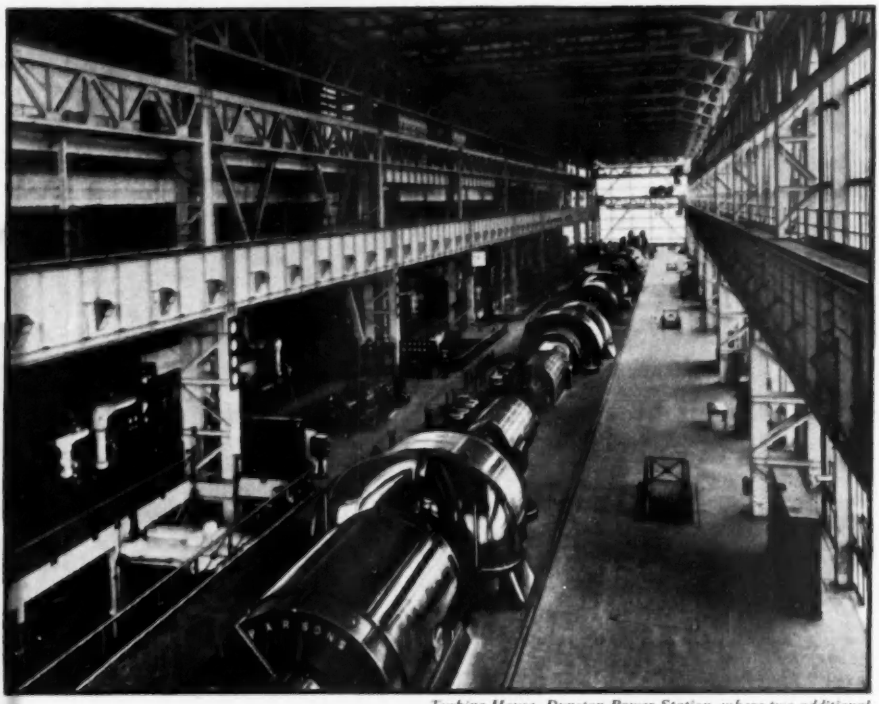
ALSO—Motor-generator sets and associated control gear; Auxiliary drives for all Mills; Drives for Process lines

The services of BTH specialists in electric equipment for steel and non-ferrous rolling mills are freely at the disposal of consulting and operating engineers

THE

BRITISH THOMSON-HOUSTON

COMPANY LIMITED, RUGBY, ENGLAND A4204N



Turbine House, Dunston Power Station, where two additional 50,000 kilowatt turbo-alternators are nearing completion

More Power from Dunston Power Station

ALL OVER THE COUNTRY, important extensions are being made to 43 of British Electricity's existing power stations. At Dunston, near Newcastle, for instance, 27,000 kilowatts of new generating capacity were added towards the end of last year, and a further 67,000 kilowatts are expected to be available before the end of the present year. Altogether, these extensions to 43 existing stations, which are part of British Electricity's plan to overcome the post-war power shortage, will add 2,750,000 kilowatts — equal to almost 3,700,000 horse-power — to the national power supply.

These extensions, together with the 38 new power stations which British Electricity are building, will provide the 'more power' so urgently needed for factories, farms and our homes.

more power to the nation

BRITISH ELECTRICITY

IMMEDIATE DELIVERY

Lundberg

LONDON AND

- Quick make and break movement
- Full amperage capacity
- Substantial wiring terminals
- Fixing straps for automatic earthing

LONDON JUNIOR

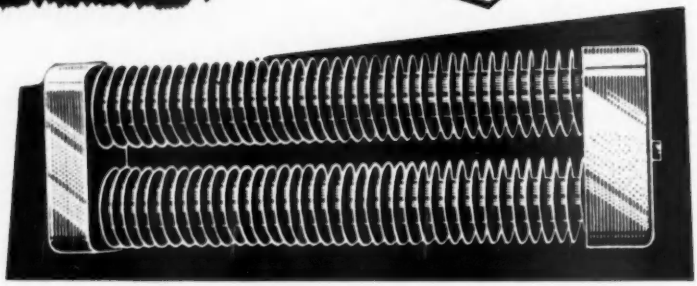
- Fully insulated for all climatic conditions
- Dirt-resisting covers and knobs in brown bakelite or polished brass
- Surface, semi-recessed and flush patterns
- Standard and silent types

MADE BY THE HOUSE OF Simplex

SIMPLEX ELECTRIC CO LTD OLDBURY BIRMINGHAM A TI COMPANY

"the atmosphere became somewhat heated..."

..by Heatrae – of course!



There are times in the year when there's a nip in the air, also cold corners in domestic or business premises. In both cases, HEATRAE GILLED-TUBE ELECTRIC AIR WARMERS provide the most economical remedy.

- **No risk of shock or damage**
- **Practically-everlasting heating units**
- **Maximum distribution of heat at comparatively low service temperature**

Remember—

In EVERY application of Electricity to creature comfort—

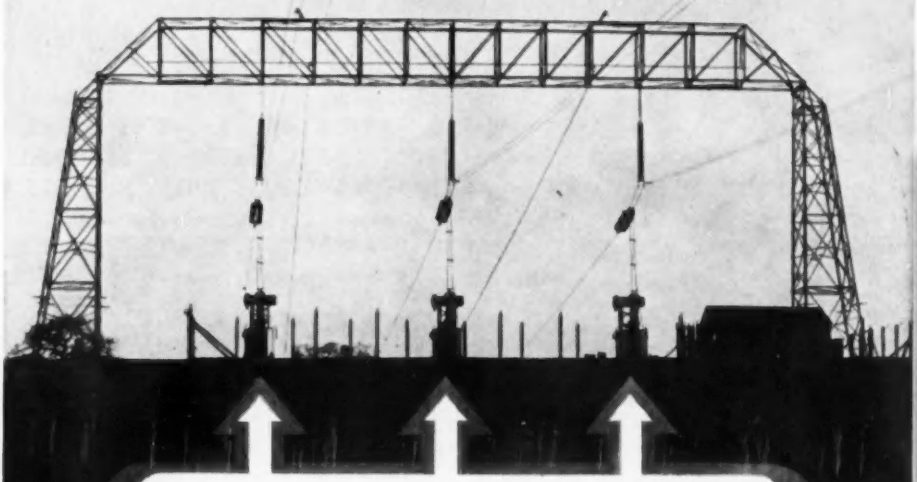
Heatrae HELPS!

Heatrae

HEATRAE LTD. • NORFOLK • ENGLAND

Manufacturers of: Electric Water Heaters, Oil Heaters, Immersion Heaters, Urns, Towel Rails, Airing Cupboard Heaters, Flame-proof Apparatus, Breakfast Cookers, Electric Fires, Food Trolleys, Warming Plates, Air Heaters.

FERRANTI
Transformers



THREE
FERRANTI TRANSFORMERS
energise a
275/300kV span at the
B.E.A. Research Station
Leatherhead

FERRANTI LTD., HOLLINWOOD, LANCASHIRE
LONDON OFFICE: KERN HOUSE, KINGSWAY, W.C.2
FT 98

Why this machine is a pleasure to sell

(and profitable too, of course)

AC/DC
200-250 VOLTS
or
100-125 VOLTS

World patents pending

It is designed on entirely new principles.
It is made by one of the foremost firms of precision engineers in the country.
It has been subjected to the most severe of tests by practical housewives.
Every job it does, it does perfectly.
It is simplicity itself to assemble, to operate, and, not least, to clean.
It is practically trouble-free.
And incidentally, it is very handsome.

THE 'LAMMIX' MIXES, MINCES, BEATS, WHISKS, KNEADS, GRATES, SLICES, MAKES SAUSAGES, EXTRACTS JUICE, ETC., ETC.

Apply to address below for full details.

Lammix
MIXER-MINCER

Manufacturers: HUWOOD COMPONENTS LTD · ST. PETERS · NEWCASTLE-UPON-TYNE, 6

HART ACCUMULATOR CO. LTD.,

Marshgate Lane, Stratford, London, E.15

Manufacturers of

STORAGE BATTERIES FOR ELECTRIC LIGHTING AND POWER INSTALLATIONS

EMERGENCY LIGHTING EQUIPMENTS
for Hospitals, Cinemas, Theatres, Public Buildings, Hotels, Business Premises, Factories, Ships, etc.

PRICES ON APPLICATION

BY APPOINTMENT TO H.M. THE KING MAKERS OF ACCUMULATORS

Telephones: MARyland 1361-3

Branches at Birmingham, Bristol, Cork, Dublin, Glasgow, Manchester, Newcastle-on-Tyne, Nottingham, and Westminster.

SCOTLAND'S LARGEST AND MOST HIGHLY MECHANISED ALUMINIUM FOUNDRY

CASTING TERMS MISINTERPRETED

'GATES & RISERS'

"The essential feature of gating is to maintain a controlled flow of metal into the mould cavity whilst the Risers act as reservoirs of molten metal to compensate for liquid shrinkage."

The system of "Gates and Risers" on any casting is of so individual a nature that only qualified experience can determine the correct technique. That experience is present at Renfrew Foundries and is always at your service.

Just another reason why you can and should

RELY ON RENFREW

RENFREW FOUNDRIES LTD

IN ASSOCIATION WITH ALVIS LIMITED FARNHAM ROYAL BUCKS

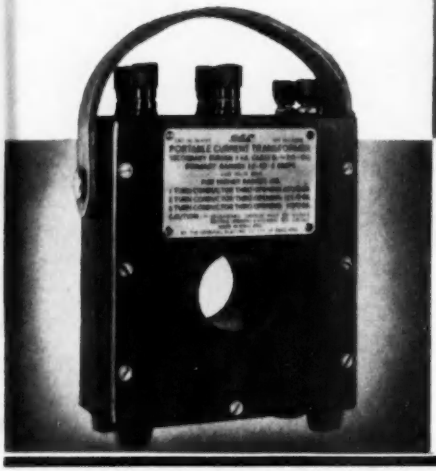
HILLINGTON · GLASGOW · S.W.2 TEL: HALFWAY 3391

RF

Is there a Meter in the house?

Most probably there is — if you can find it! If it's a "SELECTEST" you'll know where it is — for it will be in the care of a Maintenance Engineer who appreciates all the virtues of a fine measuring instrument. He knows that there are times when to have a dependable meter *on hand* is imperative. He knows also that the RELIABILITY, ROBUSTNESS and READABILITY of the "SELECTEST" are priceless virtues.

But a reasonable price is important too, it's now reduced to **£16.5.0**



Multi-Range Current

Transformer

Considerable extensions to the Current range of the "Selectest" are possible by the use of the M.4199 Multi-Range Current Transformer, enabling accurate readings of currents up to 250 Amperes. (Ranges, 5, 10, 25, 50, 125, and 250 Amps.)

Please send for Leaflets Nos. X.9798 and X.136

A G.E.C. PRODUCT

SELECTEST

MULTI-RANGE MEASURING INSTRUMENT

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

'PERSPEX' *Lights the Drawing Board*

Draughtsmen need evenly diffused lighting that is restful to the eyes, yet highly efficient. That is why Harland and Wolff Ltd., Belfast, specified 'Perspex' lighting fittings, manufactured by Crompton Parkinson Ltd., for their new drawing offices.

'Perspex' is the registered trade mark of the acrylic sheet manufactured by I.C.I.

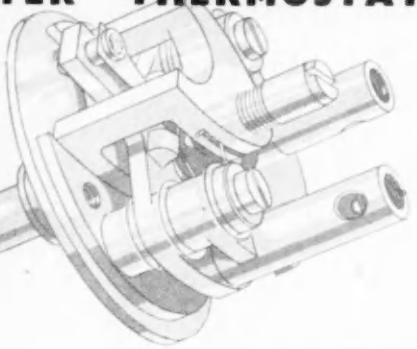
IMPERIAL CHEMICAL INDUSTRIES LTD.
LONDON, S.W.1.

ICI

P.408

Domestic temperature controls

NO. 1—WATER HEATER THERMOSTATS



A thermostat must be reliable, efficient, and robust; sensitive and capable of accurate control for years without attention. The Sunvic TQA has these qualities. Backed by craftsmanship and experience of the company that invented and developed the Simmerstat, of which almost 1,000,000 are already giving trouble-free service every day, this thermostat costs no more, yet can be relied upon for a long and useful life. Advance electricity's good name—protect its reputation.

Better feel sure—better fit SUNVIC

SUNVIC CONTROLS LTD., SUNVIC HOUSE, ESSEX STREET, STRAND, LONDON, W.C.2
TAS/SC253

A King's Luxury Costs 1d per WEEK

WARM-GLOW *Electric* Blankets

Make every Customer a friend by selling a life-long trouble-free warm bed service.

E. B. SHOWROOMS SELL IT — WHY NOT YOU?

Selected by E.D.A. for Ideal Home Exhibition.

Extract from a recent article in the "Electrical Contractor & Retailer", March, 1950:—"We hold this firm in high regard because, in the winter, we enjoy the supreme comfort of a WARM-GLOW electrically-heated blanket, and it is difficult to imagine a more delightful electro-domestic accessory than this. It represents the greatest electric comfort-giver that we have ever known. . . . Let no one argue with us as to the real safety and comfort of a properly made electric blanket. It must be experienced to be believed."

- **PURE WOOL BLANKETS. Lovely Colours. Full Bed Sizes. Bigger, Yet Cheaper.**
- **WATERPROOF ELEMENTS. Washable at Home. Highest Safety Factor. No Radio Interference.**
- **12 MONTHS' GUARANTEE. Highest Reputation for 16 years. No 1950 Price Increase.**

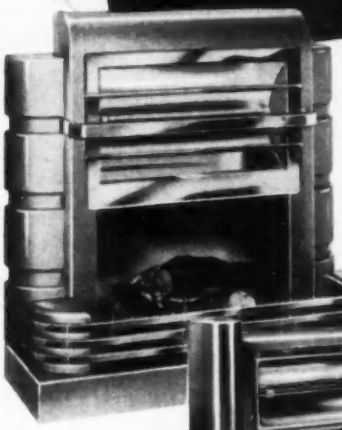
Prices from 110/- List plus tax. Stocked by all good Wholesalers. If unable to locate supplies, please write for name of nearest Wholesale stockist.

Also makers of the popular WARM-GLOW Soil Heater at 30/- List, no tax.

THE WARM-GLOW CO. LTD.
DEPT. E.T., LEIGH-ON-SEA, ESSEX
Phone: Leigh-on-Sea 75997. Grams: Warmglow, Leigh-on-Sea.

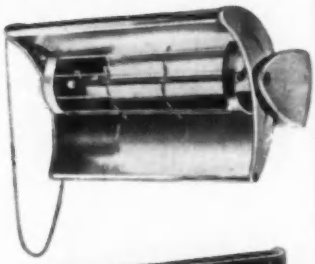
Before the temperature begins to fall

Build up your stock of "XCEL" Electric Fires. It only needs the first cold snap for your customers to make up their minds that they *need* electric fires.

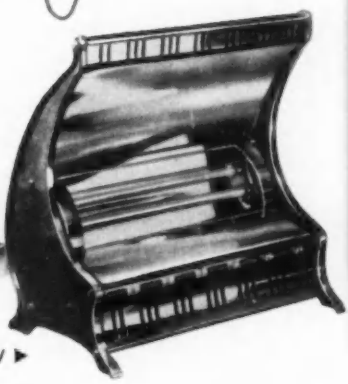


▲ R1018—2 kW "Calder" log effect "Cosyglo"

R1014—1 kW "Bathroom" ▶



R1006—2 kW ▶ "Woolton" coal effect "Cosyglo"



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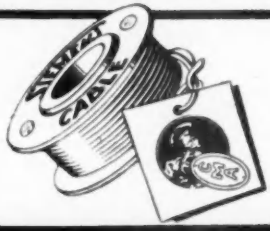

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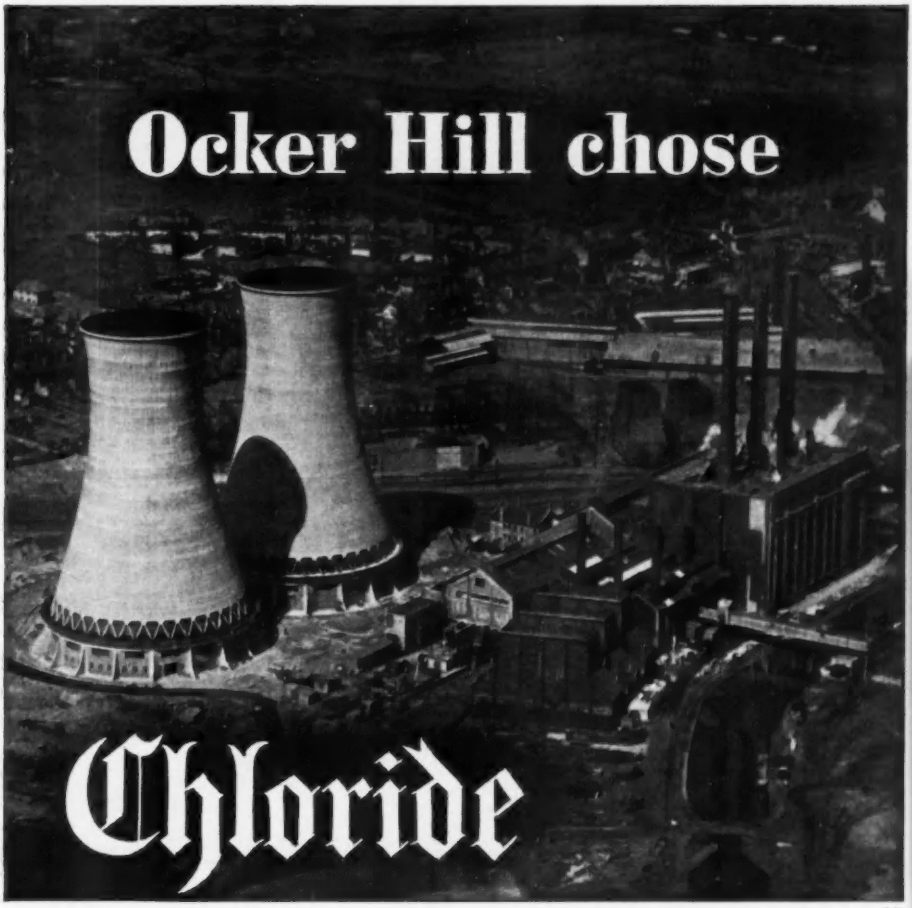

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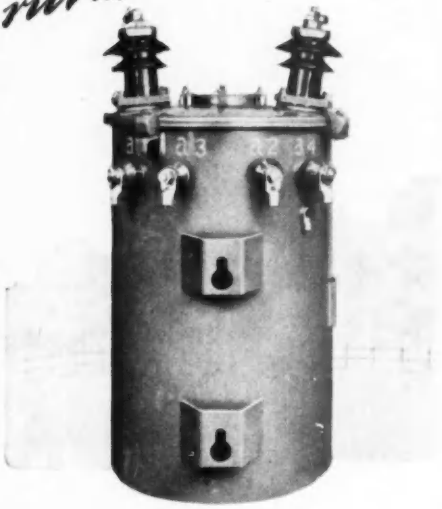

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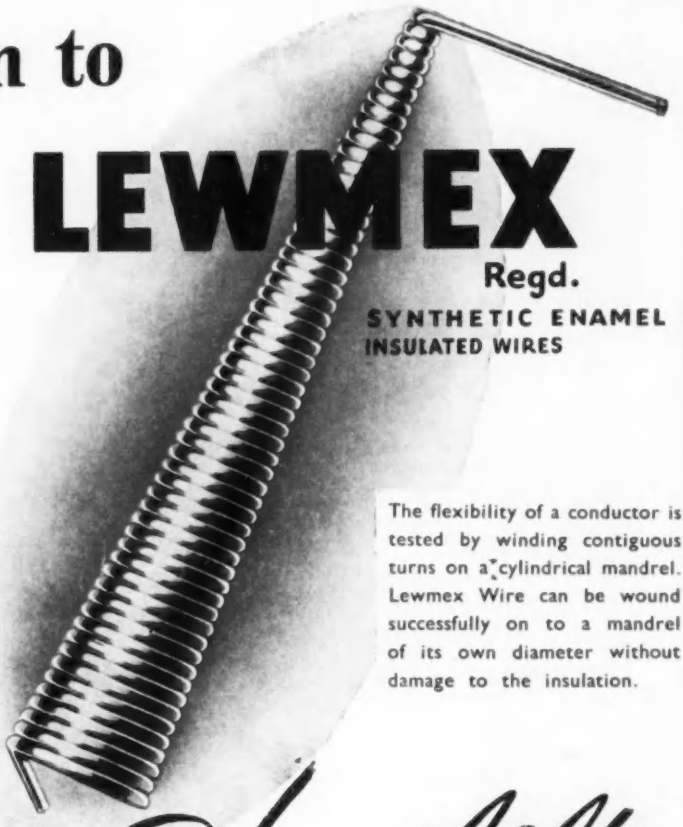

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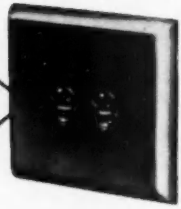

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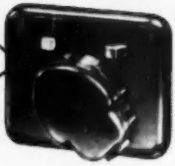

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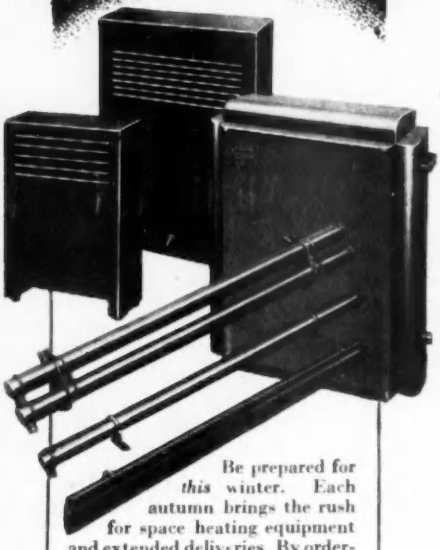

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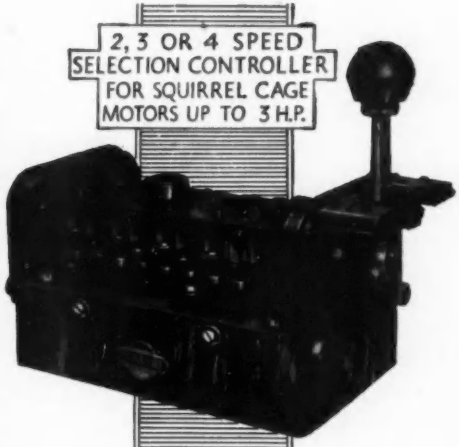

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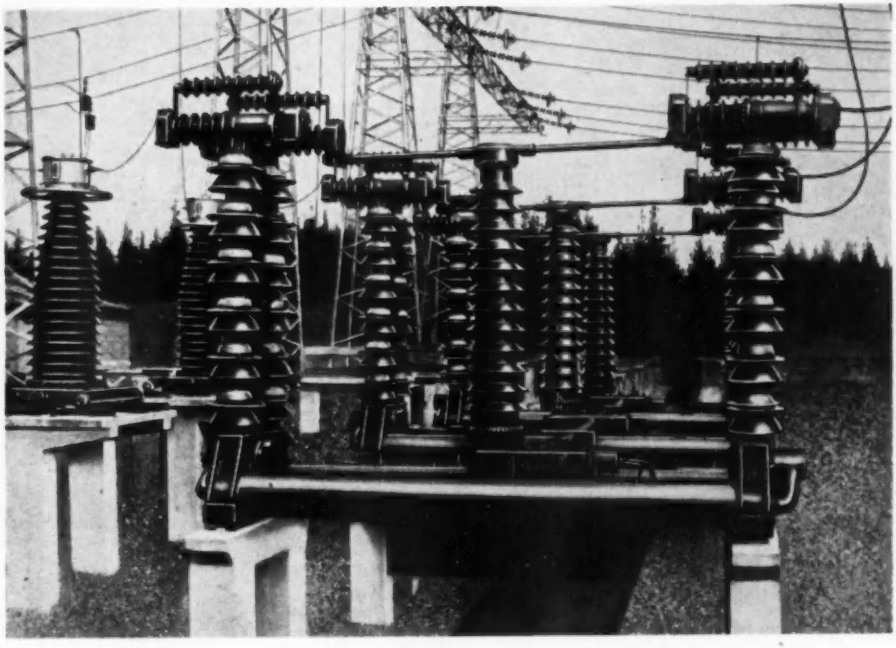

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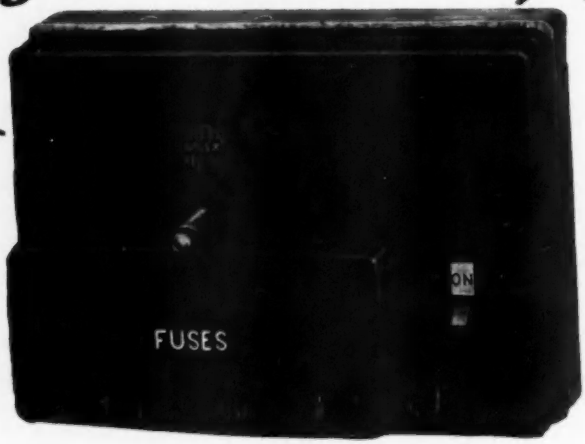

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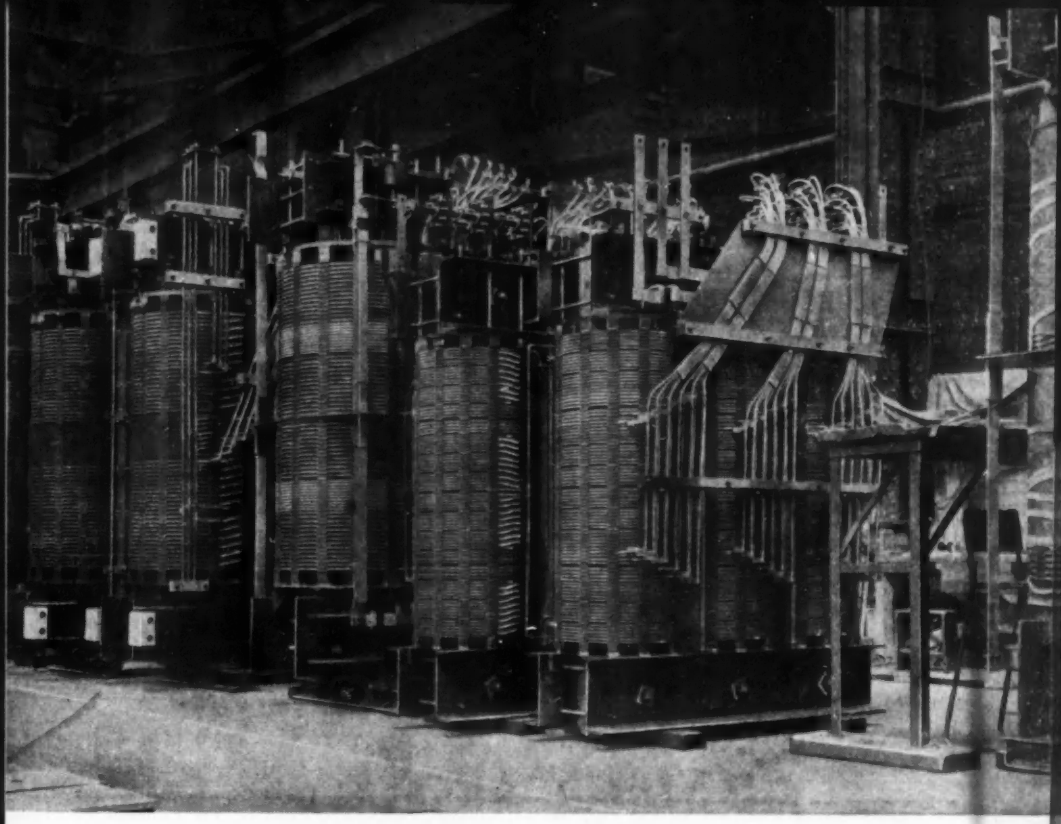

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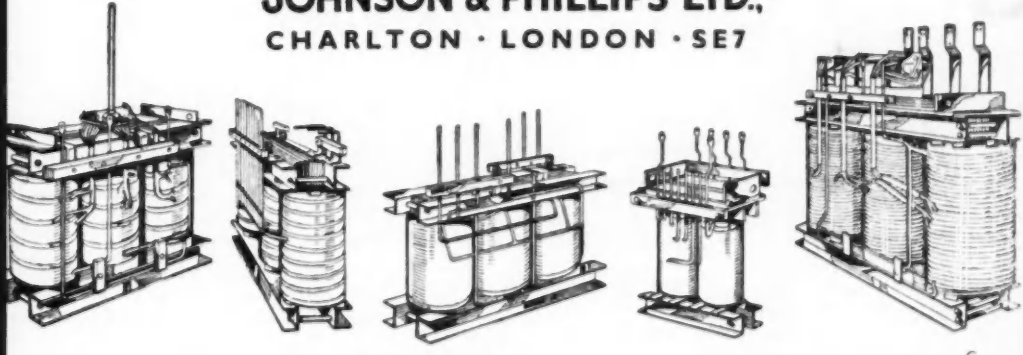

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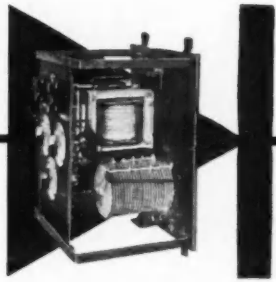

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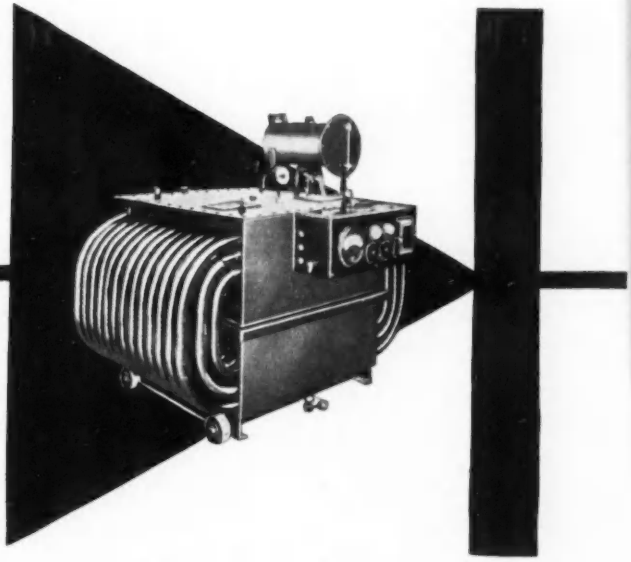

Top illustration: Battery Charger (Cover removed)
Lower illustration: E.H.T. Rectifier Equipment (Oil immersed)

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ELECTRICAL TIMES

Vol. 118 No. 3073 THURSDAY, 28 SEPTEMBER, 1950

PUBLISHED EVERY THURSDAY

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HAYLE GENERATING STATION, PHOTOGRAPH ... 485

ALUMINIUM PROCESSING ... 486

I.E.E. SUPPLY SECTION SUMMER VISIT ... 493

I.E.E. 1950-51 SESSION OPENS ... 494

PROBLEMS AND PRACTICE IN ENGINEERING ... 496

A.P.L.E. ... 498

LIGHTING ACCESSORIES ... 503

OVERSEAS NEWS ... 504

PERSONALITIES IN THE INDUSTRY ... 506

ELECTRIFICATION OF TRANSPORT ... 508

THE BUYER'S COLUMN ... 509

B.C.E. PRIVATE EXHIBITION ... 510

EXPORTS AND IMPORTS ... 511

THE WEEK IN NEWS 512

- Questions in Parliament ... 516
- Electric Supply News ... 516
- Company Activities ... 517

COMMERCIAL INFORMATION ... 518

CLASSIFIED ADVERTISEMENTS ... 47

INDEX TO ADVERTISERS ... 56

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Editorial

ELECTRONICS IN INDUSTRY

ALTHOUGH reliability of electronic equipment has now reached a state where it is comparable with general plant performance, there still exists in many industries a long-standing prejudice against apparatus which utilises valves. Yet the capability of electronic devices for speeding-up output on mass-production or continuous process lines is well proven, and several new factories are taking advantage of this. At the Rogerstone plant of Northern Aluminium, for example, a wide variety of electronic devices are in operation. Infra-red detectors measure metal temperature; electric strain gauges indicate roll pressure; photo-electric cells watch the strip progressing along the run-out table and check the finished sheets, while electronic counters ensure the correct number of plates in each stack. The time and labour saving made possible by these techniques is of considerable importance in this particular mill. But there are many other production lines in the country still using human labour for such tasks where the expenditure of a few hundred pounds on electronic equipment would repay itself many times in increased productivity.

POSITIVE PUBLICITY

IN the last few years the poor consumer has been the target for a great deal of propaganda from the supply industry, and it is now generally recognised that the "keep-off-the-peak" theme of earlier publicity was a mistake. The problem of encouraging electrical usage without adding to plant shortage is better met by slogans of the "use-electricity-in-off-peak-hours" type. This change from negative to positive publicity is not yet so widespread as might be wished and only last week we received from one of the Electricity Boards a rota of load shedding which is being given to every domestic and commercial consumer and must seem to them full of unpleasant foreboding. The intention of the Board to inform consumers of their order of precedence for load cuts, is an admirable one but its effect may be more than disappointing. Few consumers are likely to study day-by-day the fearsome-looking table, even if they succeed in understanding it. And when the solution has been successfully determined, it is still subject to the greatest of all variables, the British climate. The main effect of this card, therefore, will be to stress once more the possibility of load cuts, to an extent beyond probability even in a cold winter, and the casual reference on the card to abundant electricity at off-peak times will do little to counteract the general negative effect so deadening to the efforts of the sales side. Load cuts may not prove to be so bad after all, so let us get rid of our inferiority complex on peaks and go back, once more, to the slogan of "Use Electricity."

LUMENS AND LOLLIPOPS

CRITICISMS of the general standard of British street lighting were frequently made at the A.P.L.E. Convention, last week, and there were many sympathisers with Mr. V. W. Dale in his reference to installations "reminiscent of the eighteenth century, unworthy of the nineteenth, and utterly intolerable in the twentieth." Yet we do not seem to be alone in this. Mr. A. F. Dickerson, a prominent advocate of better street lighting in the U.S., has recently complained (according to the *Electrical World*) that, although night traffic accidents cost 20,000 lives and millions of dollars' worth of property in a year, America spends less on street lighting than it does on one particular brand of candy. While we do not agree entirely with the cynics who say that sweet

rationing alone prevents a similar indictment being applied to this country, we do endorse the view expressed by Lord Lucas in his speech at the luncheon, when he remarked that nothing short of a mass awakening of the civic conscience on the subject of street lighting would serve to reduce night traffic accidents. A few statistics of this type prominently displayed, might be of assistance in this direction.

REFLECTIONS ON ROADS

PARADOXICALLY enough, the greatest contribution towards the lighting of roads may come, not from the lighting engineer, but from the civil engineer. In lighting techniques we are, at least as far advanced as any other country, while in some applications—notably fluorescent street lighting—we are well ahead of the rest of the world. Road surfaces themselves, however, are still far from ideal, and a powerful and well-planned installation may be ruined by bad reflecting properties which waste most of the light. Not that the road engineer has an easy task. Many of the qualities so desirable to his lighting colleagues directly conflict with his own requirements of long life and lasting non-skid properties, and to judge by the poor reflective power of many modern surfaces, a vast amount of research remains to be done on the evolution of a surface acceptable from all points of view. The fact that a member of the Road Research Laboratory took an active part in this year's A.P.L.E. proceedings for the first time is a welcome sign that this necessity is beginning to be fully appreciated by those concerned.

DO YOU APPROVE?

ONE of the useful activities of the Electrical Association for Women has been the determination of the likes and dislikes of women for man-made electrical articles. This has lead to some important improvements in equipment and now they are undertaking an even more ambitious questionnaire on personal experience with all classes of electrical appliance. This should be particularly valuable now that post-war design has had some years to crystallise. Although both by tradition and experience Meteor is loth to query on the ways of women, we cannot refrain from doubting the wisdom of two of the questions, first on the desirability of standardisation of voltages. We shall be disappointed if the poll is less than 100%, but what useful purpose will it serve? Similarly, the question on standardisation of plugs and sockets seems no more than the setting-up of a familiar and much-bedraggled Aunt Sally. It was the pressure for standardisation that led to the introduction of new designs some few years back, and in consequence today confusion is far greater and will become progressively worse until the number of new and old plugs in use is approximately equal. If only the ladies could tell us how standardisation of plugs could be achieved they would, indeed earn the gratitude of the industry.

Meteor

THIS WEEK'S PHOTO

HAYLE generating station is situated not far from St. Ives and Land's End, at the western extremity of the British Grid System, and is operated by the South Western Division of the British Electricity Authority. The station is situated among the sandhills at the mouth of the Hayle River, which flows into St. Ives Bay. Supply from the site commenced in 1910 under the Cornwall Power Co. There are now no traces of the old steam engines, all of which have been removed to make way for modern plant commencing in 1928. The low pressure section (235 p.s.i.) of the station was completed in 1939 when the capacity was 32,500 kW, made up of B.T.H. and English Electric turbo-alternators, together with Babcock and Wilcox and Stirling boilers. The first high pressure plant (400 p.s.i.), consisting of an English Electric set and Stirling boilers, was installed in 1947. A further 20,000 kW extension should be available shortly, when the total capacity of the station will be 67,500 kW. The most interesting feature of the station is the circulating water arrangements. Sea water is impounded at high tide in a large pool, from which most of the cooling water for the station is taken. Contrary to the usual practice of returning the outlet circulating water directly back to the sea, this water is passed to an adjacent industrial enterprise. Here, the bromine in the sea water is extracted and is used in connection with the doping of motor and aviation spirit. The sea water at Hayle has a fairly high bromine content, and the heat added in the power station condensers facilitates its extraction.

ELECTRICAL TIMES POWER STATION SERIES.
No.80
Hayle.

ALUMINIUM PROCESSING

New Continuous Strip Mill Adds 35% to Britain's Rolling Capacity for Aluminium Sheet

LAST week, the Minister of Supply, Mr. Strauss, formally opened the new continuous strip mill erected by the Northern Aluminium Co., Ltd., at their works at Rogerstone, near Newport, Mon.

At the opening ceremony, Mr. G. R. Strauss, Minister of Supply, complimented the Northern Aluminium Co. on the establishment of the new works in South Wales, and referred to the importance of aluminium production both for peace and war. The interwar period had been an unhappy one for the district due to the fact that it was mainly dependent on heavy industry, and the works would provide an assurance of long term employment and prosperity.

He said that his Ministry was still supplying all aluminium to fabricators and had arranged to buy great quantities over the next few months. Relationship between the Ministry and its biggest supplier—the Aluminium Co. of Canada had always been happy. The mill was then formally opened by the Minister who started up the ingot scalping machine.

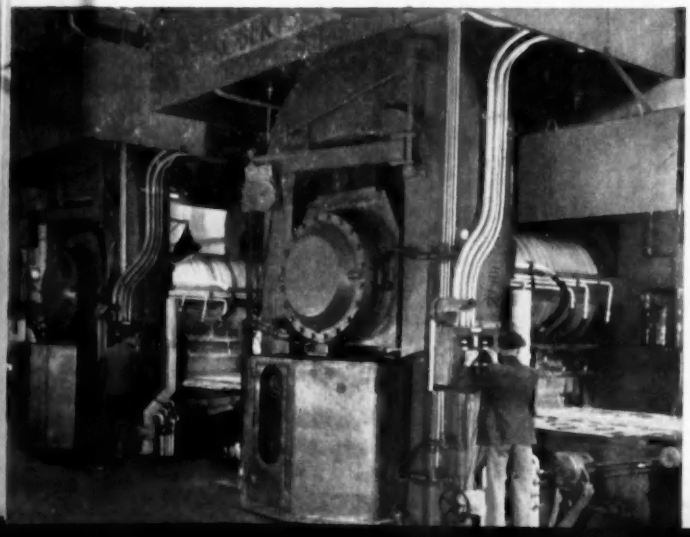
This mill is primarily designed to achieve maximum production with minimum cost, and for that reason is at present dealing with alloys for which there is the greatest and most consistent demand, mainly Noral 2S and a 1¼% manganese alloy, Noral 3S. Principal products have also been restricted to container sheet, corrugated sheet and building sheets of all kinds, circles, and foil stock.

Although the output capacity of the plant as it stands is 50,000 tons per annum, care has been taken in the layout to allow for expansion up to three times this figure should the need arise. In fact the hot rolling capacity is capable, in its present state, of coping with considerably more than 50,000 tons/year.

General Flow Sequence

The raw material comes into the mill as pure aluminium ingots from Canada and as process scrap and trimmings. In the former case, the ingots weighing up to 4,000 lb. are ready for direct processing. In the latter, however, the scrap is melted down in low-frequency induction furnaces and cast into the appropriate size. In order to keep the induction furnaces working at full power for the maximum amount of time, arrangements have been made to siphon off the molten metal into electric resistance furnaces, where it is maintained at a steady temperature while its chemical composition is being checked, prior to casting. A semi-continuous casting process is used in which the metal is poured into a water-cooled mould, the base of which is slowly lowered by a hydraulic ram as the metal solidifies. Each of the two machines installed is capable of casting 9,000 lb of metal, more than double the weight of the usual ingot required by the mill, and the ingots are cast in pairs.

The first process prior to rolling is to "scalp" the ingot on a large milling machine capable of machining a face 10 ft long by 5 ft wide. Manipulation of the ingot during this process



Aluminium sheet passing through the two four-high finishing stands

is carried out by means of hydraulically operated tables and the total machining time is about 5 minutes. The ingot is then pre-heated in "push through" type furnaces to the appropriate rolling temperature lying in the range, 420° C to 550° C. From the furnaces an overhead crane-type discharger deposits the ingot on to a tilting table which in turn lowers it on to the "live roll" table when the mill operator is ready.

Initial breaking down is carried out by a two-high Reversing Mill, driven by a 2,000 h.p. motor. The rolls of this mill are 35 in. dia by 96 in. long and the ingot is rolled for five or more passes. Leaving the mill, the thickness has been reduced from about 9 in. to 2½ in. From the first mill, the slab travels on the roller table to an Intermediate Reversing Mill powered by a 1,650 h.p. motor. This mill in turn reduces the thickness from 2½ in. to finishing mill gauge (between ⅜ in. and ¾ in.). At this stage the length of the slab may be about 150 ft.

Before entering the Hot Finishing Mill the slab travels to an up-cut shear which trims the front end, and then to an edge trimming machine where any cracks which may have developed during the rolling of the harder alloys are cut off.

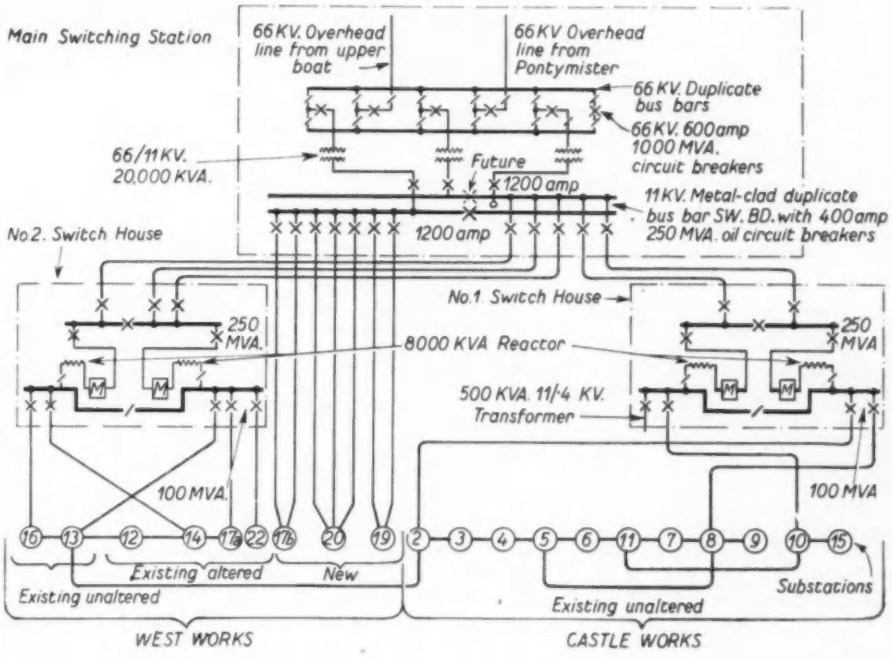
The hot finishing mill accepts the trimmed slab, and in one pass rolls it down to the gauge required in the final coil. This reduction, which may be 80%, is carried out by two four-high stands in tandem, each with work rolls of 24 in. dia and back-up rolls 56 in. dia. Roll length is 88 in. The power required for this process is naturally somewhat higher than with the reversing mills, and the first stand is driven by a 3,000 h.p. motor while the second is powered by a 2,600 h.p. unit. The length of the product at this stage is about 600 ft and it emerges from the mill at about 800 ft per minute. Thickness is dependent on the subsequent processing required but varies from 0·100 to 0·250 in.

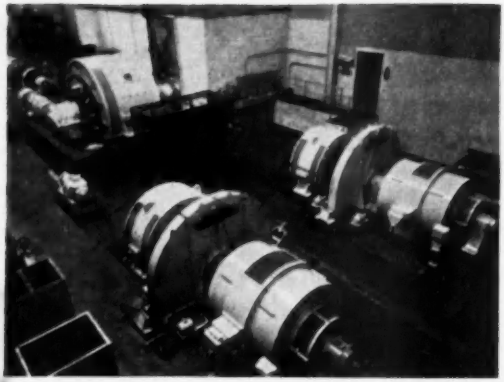
On leaving the finishing mill the slab emerges on to a 700 ft table consisting of 235 individually driven rollers which carry the metal under water sprays to the coiler at the remote end.

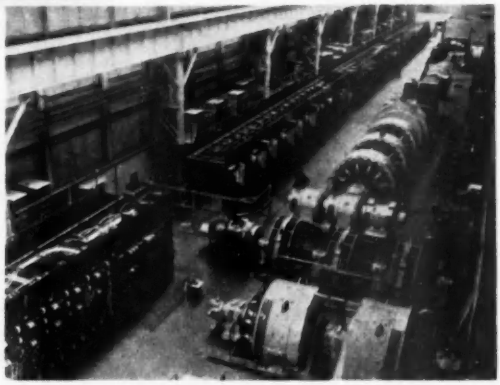
Cold Processing

Cold rolling is also carried out in the new mill. The Cold Mill is a three-stand four-high tandem, the outstanding characteristic of which is its high speed, strip emerging from it at 2,000 ft. per minute in 3,500 ft. lengths. From

Schematic diagram of the combined works supply network


Main Switching Station
66 KV. Overhead line from upper boat
66 KV Overhead line from Pontymister
66 KV. Duplicate bus bars
66 KV. 600 amp 1000 MVA. circuit breakers
66/11 KV. 20,000 KVA.
Future
1200 amp
11 KV. Metal-clad duplicate bus bar SW. BD. with 400 amp 250 MVA. oil circuit breakers
No. 2. Switch House
1200 amp
No. 1. Switch House
250 MVA.
8000 KVA Reactor
250 MVA
500 KVA. 11/4 KV. Transformer
100 MVA.
100 MVA
16 13 12 14 17 22 18 20 19
2 3 4 5 6 11 7 8 9 10 15
Existing altered
New
Existing unaltered
Existing unaltered
Substations
WEST WORKS
CASTLE WORKS





(Left) The two Ilgner sets supplying the 1,650 h.p. mill motor (left) of the Intermediate Mill in the Hot Line; the d.c. panel is between the Ilgner sets and the mill motor. (Below) The substation for the Cold Mill: the twin 1,300 h.p. motors driving the third stand of the 3-Stand Tandem Mill in the foreground; the 10,000 h.p. TKV motor-generator set supplying the mill in the centre; and in the distance the 1,000 h.p. mill motor of the Temper Mill, with its associated M.G. sets. On the left is the d.c. control panel for these mills and for other finishing equipment; the flat-back board on the right carries a.c. control gear for mill auxiliaries and motors of conveyors, etc.

this point the metal is transferred, having been re-coiled, to the appropriate line depending on the finished product required. Building sheet is handled by the Heavy Shear Line, while the remainder progresses to the Slitting Line.

The Heavy Shear Line, consists of a leveller which straightens out the strip as it is drawn off the coil, a flying shear, which cuts it into sheets of the appropriate size; a belt conveyor system, which carries the sheets to the corrugator if required and an inspection department.

The Slitting Line starts with the Slitter itself which edge-trims the coil to final width and can, if required, slit it into two or more strips. The first operation may be used to trim the edges of foil stock; the second is used for container-sheet which has already been rolled in multiple widths on the Hot Line and three-stand Tandem Mill and must be slit to final width (not more than 30 in.) before temper rolling. Coils destined for the Circle Blanking Press are slit into six or eight strips of 8 in. maximum width. After the slitter, all coils with the exception of those required for the blanking press are annealed prior to further cold working. Foil coils are normally given an anneal at the final gauge which is usually about 0·018 in., before dispatch to the foil manufacturer who thus receives them in a suitable condition for the final rolling to foil gauges. Container sheet is annealed at an intermediate gauge and finished on the Temper Mill—a single stand four-high unit with rolls of 12 and 32 in. dia. by 36 in. long. Very high speeds are reached on this mill, up to 2,000 ft per minute, and the coil length may be about 5,500 ft. The width, however, is restricted to 30 in. Finally the coils are transferred to one of two Light Shear Lines for cutting up into the requisite sizes. The plates are classified automatically, doubtful ones being delivered to a sheet inspection line for visual examination, and then packed and shipped.

Electrical Equipment

From the above it can readily be realised that the electrical equipment required to operate a mill of the extent and capacity of Rogerstone is large and complex requiring the application of techniques covering all branches of electrical science. Electronics, radio-activity, heavy-power engineering, low- and high-voltage distribution have all a part to play.

Owing to the size of the plant it is, of course, impossible to give anything but a general description of the electrical systems involved. Further, the system is complicated by the fact that it is a combination of the older distribution system which existed prior to the erection of the new hot-rolling line, and a new additional superimposed system.

Originally the maximum loading of the works was 5 MVA. Due to war expansion, however, this rose to a load capacity of 20 MVA,

although the m.d. remained at about 15 MVA. The new plant, however, is expected to develop peak loads of the order of 35 MVA, and it became necessary to reconstruct the old system to cope with this and any possible further increase in load.

Incoming Supply

Two 66 kV lines, one from Upper Boat Power Station and one from Pontymister Substation, can carry maximum loads of 45 MVA and 20 MVA respectively. These feeds are connected at the main switching station to duplicate 66 kV busbars through English Electric Co. type OBL5 air-blast circuit-breakers, rated for 600 amps load and 1,000 MVA rupturing capacity. From the busbars, feeds are taken off to three 20 MVA 66/11 kV transformers, two of which are by the British Electric Transformer Co. and one by English Electric. These are all fitted with automatic on-load tap-change gear, and separate coolers with automatic control of fans and auxiliaries.

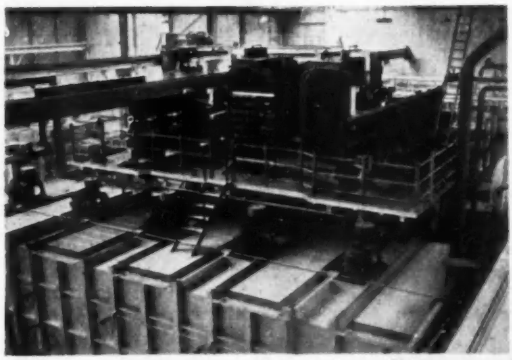
The 11 kV network comprises a duplicate busbar system fed by the three 20 MVA transformers through English Electric OLD IB switchgear with solenoid operated o.c.b.s rated at 1,200 amps. The outgoing switchgear is rated at 400 amps with a breaking capacity of 250 MVA and through these circuit-breakers power is fed to the switch-houses and three new substations. These two switch-houses were originally constructed to feed the East and West works, and have been redesigned to fit in with the new plant. The original switchgear of 100 MVA rupturing capacity at 11,000 volts has been retained by the addition of busbar reactors which limit the fault value.

The three new substations are fed directly from the 11 kV busbars at the main switching station through a 640 yd long cable tunnel. Three 0·25 sq in. p.i.l.c. cables feed No. 20 substation, two 0·25 sq in. feed No. 17B, and two 0·4 sq in. feed No. 19. The switchgear in these substations is of 250 MVA rupturing capacity. This is because they are connected directly to the 11 kV main switching station busbars and the potential fault current is thus much greater.

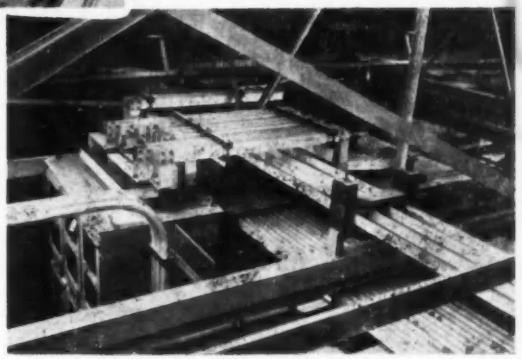
The switchgear in the substations fed from No. 2 switch-house is of 100 MVA rupturing capacity, with truck cubicle type switches controlling the outgoing feeds. All the 11 kV substation switchgear and 400 V switchgear was made by Ferguson Pailin.

Although the motors of the large motor-generator sets are fed at 11 kV, general distribution is at 400 volts from eight 750 kVA and ten 500 kVA transformers made by the British Electric Transformer Co., Ltd. A 460 V d.c. supply is also provided either by a 600 kW Crompton Parkinson rotary converter in No. 17A substation, or by a 500 kW English Electric mercury arc rectifier in No. 20 substation.

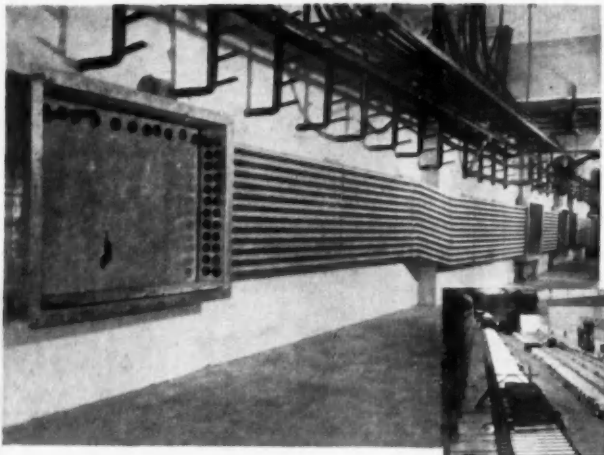
Aluminium conduit is largely used in these works, and in fact a total of over

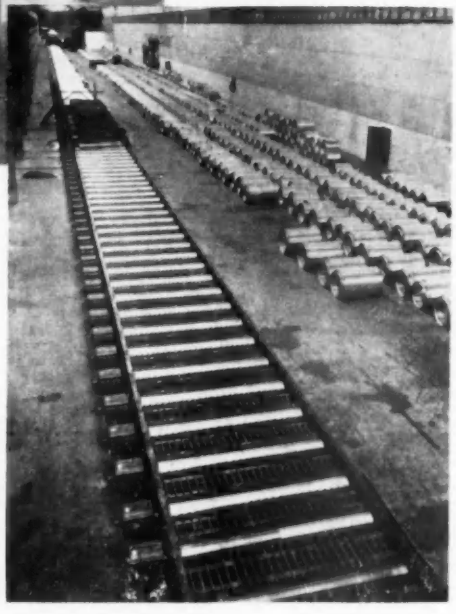


(Above) Transformers, 11·4 kV, mounted above the 4,000 kW preheat furnaces which they supply. Note aluminium busbars connecting the transformers to the Donovan Electric contactor panels



(Right) Aluminium busbar interconnections between low frequency Induction Melting Furnace and associated transformers, control gear and capacitors. The sizes of bars used are 4 in. by $\frac{1}{4}$ in. to carry 513 amps at pressures up to 461 V, 3 in. by $\frac{1}{2}$ in. to carry 418 amps at 115 V, and 5 in. by $\frac{7}{16}$ in. to carry 700 amps at up to 461 V





(Left) Aluminium conduits and junction boxes carrying control and auxiliary cabling of cold roll mills
(Below) The run-out tables of the hot line, showing the live rolls, of which there are 235, each driven by a motor mounted on the end of its shaft. The 1·1/0·2 h.p. induction motors are fed from "Speedmaster" frequency convertors

one million feet of sections ranging from ¾ in. up to 4 in. dia. has been installed.

Most of the three-core low-tension distribution is by lead-covered paper-insulated cable, of which about 10,000 yds was used, and smaller feeds involved about 360,000 yds of special v.r.i. cable made by B.I. Callender's. Further, some 10,000 yds of single and three-core varnished cambric insulated and braided cable was also used.

Breaking-down Mills

The Breaking-down Hot Mill (No. 1 stand) is driven directly by a 2,000 h.p. 440 V d.c. compensated shunt reversing motor, the maximum speed being 51 r.p.m. Power for this machine is derived from a 2,350 kVA m.g. set in No. 14 substation. This set comprises a 2,420 h.p. 11 kV synchronous motor, driving two 850 kW generators. Ward-Leonard control is provided for both mill drive and for the live roll conveyor motors. An interesting example of manipulation is provided by the entry table in front of the mill which has two sets of rollers, each of which extends from the side only to the centre of the line of travel. After the ingot has been centred, it may be turned by driving the two sets of rollers in oposite directions or at different speeds. Full control of the mill is exercised by two operators working in the same control cabin. One operator takes charge of the ingot tilter and the entry tables, including the turning table, and the senior operator is responsible for the mill, screwdowns and delivery tables during rolling. He also has master control over certain of the entry tables.

From this mill the ingot passes to the Intermediate Hot Mill, which has somewhat different supply arrangements, being driven by a 1,650 h.p. mill motor which derives its power from two duplicate Ilgner sets in No. 17A substation. Each set is driven by a 1,000 h.p. 11 kV induction motor, and the two 1,190 kW generators deliver through air-break circuit-breakers to common busbars.

Between the intermediate hot mill and the two-stand tandem hot finishing mills is a shear and trimmer. These are controlled from a separate pulpit which also can take charge of three of the four delivery tables from the intermediate mill. In addition indication is given to the operator by means of Selsyn drives of the strip width for the side guides, and various subsidiary controls are included for such auxiliaries as the scrap cutter and conveyor.

A two-position switch on the desk enables the speed of the tables and trimmer to be regulated either by a hand-lever control or auto-

matically brought into step with the speed of the first finishing mill stand.

Thus the strip leaving the intermediate mill is run on hand control up to the shear, where the leading edge is cut, then through the trimmer and up to the first finishing stand. The operator then switches to "Mill" and the operator of the finishing mills takes control.

Finishing Mills

Two stands operating in tandem are installed at present although provision has been made for two more to come into operation at a future date. These stands are driven by two motors of 3,000 h.p. and 2,600 h.p. respectively, the former driving direct at speeds up to 96 r.p.m. and the latter driving through a 1·57 : 1 ratio gearbox, maximum motor speed being 400 r.p.m. Power is supplied to the motors at 440 volts d.c. from two similar synchronous m.g. sets in No. 17B substation, the 11 kV motors being rated at 2,870 kVA and designed for operation at unity p.f. Automatic control is, however, provided to enable either p.f. or reactive kVA to be kept constant, irrespective of shaft load.

Other equipment in No. 17B substation includes a main exciter set driven by a 110 h.p. motor; a looper set driven by a 23 h.p. motor, and two amplidyne sets (one for each synchronous motor) driven by 40 h.p. motors, all supplied from the 400 V system.

Ward-Leonard control is used for the mills, the relative speeds of the stands being set according to the reduction in thickness of the strip in the first stand, and adjusted as necessary to maintain the desired tension between the stands. The inter-mill tension is also controlled by a looper roll operated by a high-torque motor which can be adjusted either manually or set to automatic working.

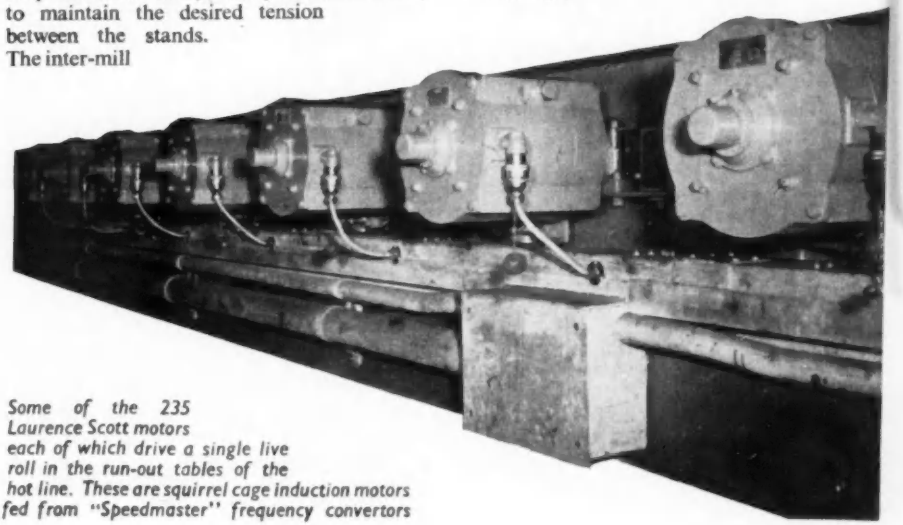
At each stand, mounted on the mill housings, are controls for screwdowns and side guides, and an emergency button is provided to apply dynamic braking to the mill in emergency, but the main control is centred in a large cabin in a commanding position which gives a full view of the whole bay. From this cabin the whole of the hot-line is co-ordinated, a loud-speaker system with microphones and speakers at each of the five operative positions providing means of intercommunication.

Run-out Tables

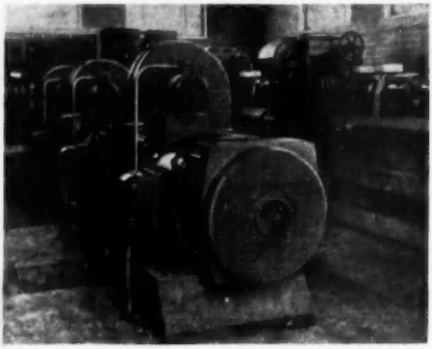
The run-out table is 700 ft long and has 235 individually-driven rollers, giving a strip speed range of 150 to 1,000 ft/min. Each roll is separately driven by a Laurence, Scott and Electromotors, floating type, variable speed induction motor of totally enclosed construction nominally rated for 1·1/0·2 h.p. 350/75 r.p.m. The table is divided into three sections, each of which is individually supplied at a variable frequency of 37 to 8 c.p.s. from separate Speedmaster equipment.

In order to minimise the effects of shock and vibration the motors have their rotors built on sleeves which mount directly on to extensions of the roller shafts, the stators being prevented from rotating by ball-jointed tie-bars which are fixed to one end of the table frame.

The vari-



Some of the 235 Laurence Scott motors each of which drive a single live roll in the run-out tables of the hot line. These are squirrel cage induction motors fed from "Speedmaster" frequency convertors



Three of the L.S.E. Speedmaster frequency convertors, each giving 130 kVA, 37/8 c/s, 95/21 V

able frequency supply has the great advantage that internal heating of the motors is kept low during the frequent starting, plugging, acceleration and retardation encountered in the mill duty cycle.

"Speedmaster" Operation

The machines used for providing the variable frequency supply have been developed from the L.S.E. type N.S. variable speed a.c. motor. Slip rings have been added to the rotor, and the commutator is fed at mains frequency from an induction regulator which pre-determines the speed, output frequency and voltage. A winding on the Speedmaster stator promotes the necessary rotation, while a special commutating winding on the rotor ensures good sparkless commutation under all operating conditions.

The induction regulators, which control the output frequencies of the Speedmasters, and thus the speeds of the various associated motors, are operated by small squirrel-cage induction motors during remote hand control of the equipment, and by wound rotor induction motors during automatic synchronising of mills, rollers, shears and coiling plant. The 100 h.p. trimmer motor and 150 h.p. coiler motor are both a.c. commutator motors fed from separate Speedmasters.

Cold Rolling Line Supply

Although the "hot" line is the main item of interest, the cold rolling plant is well worthy of note and possesses many elaborate electronic refinements and electric control devices which make it unique. Practically all the control gear and m.g. sets for the cold rolling plant are housed in No. 20 substation, which is 360 ft long by 40 ft wide.

The three-stand cold rolling mill is powered from a 10,000 h.p. synchronous motor generator set coupled to three 2,600 kW 550 V d.c. generators which feed into a common busbar of 6 in. x ¼ in. section. The motor is fitted with automatic p.f. control.

Each stand of the mill is driven by twin 1,300 h.p. motors on the same shaft to reduce inertia problems. A series booster set is provided for the mill motors and consists of a 400 h.p. 585 r.p.m. 3·3 kV induction motor driving three 142 kW 37 V generators.

Owing to the high speed of the mill, a large number of auxiliary machines are installed to provide compensation for inertia during acceleration and deceleration, control of interstand tension, voltage drop under heavy load, automatic control of the main generators, and tension adjustment for the winding reel.

Strain gauges on the mill housings give readings of the screwdown pressures on the front and back housings, and equipment has been installed to enable complete records to be obtained of all speeds, tensions, gauge, torques, etc., up to the full rated strip speed of 2,000 ft per minute.

The temper mill is powered by a synchronous m.g. set of which the 11 kV motor is rated at 1,400 h.p. The driving motor is rated at 1,000 h.p. B.T.H. again supplied all the electrical gear for this mill.

Finally the aluminium strip is transferred either to the heavy shear line to be flattened, cut or corrugated, or to the light shear line for container sheet. Both these lines contain a considerable amount of complex electrically operated equipment, the detailing of which is beyond the scope of this general article. It is of interest, however, to see the manner in which electronic equipment is being extensively used. Photo-cells are installed to control the loops, electronic counters are employed to check the number of sheets stacked on the pallets, off gauge metal is rejected by a solenoid-operated gate responding to impulses set up by a flying micrometer and stored in a synchro-timer, full electronic control is exercised over the sheet inspection line (the equipment was made by British Electronic Products, Ltd.), low-temperature pyrometers give a continuous reading of temperatures at important points on the hot line, and to check gauge, a Beta-ray comparison type flying micrometer is used.

This mill represents the most advanced practice in the field of aluminium rolling, and is a remarkable tribute to the skill and efficiency of the designers of both heavy and light electrical plant and equipment.

I.E.E. Supply Section

Annual Summer Visit

Mr. Leach responds to the toast of "The I.E.E."

THE choice of Stratford-on-Avon as a centre for the I.E.E. Supply Section Summer Visit was an excellent one, since it affords a combination of historical interest and delightful country with scope for reasonably accessible technical visits. A party of some 160 members and their ladies foregathered last Thursday night, and the first visit on Friday morning was to the British Thomson-Houston works at Rugby.

B.T.H. Works

The ladies were specially catered for by a visit to the Mazda lamp works and an opportunity to inspect a display of modern domestic appliances. The more technically minded however were offered a tour of the turbine shop and new extensions devoted to heavy plant manufacture. The latter building has been provided for the largest electrical machines and transformers yet envisaged. It has an area of 125,000 sq ft, and the height of the building demanded new high-powered lamps. Fourteen 5½ kW units have been specially made for this purpose; these combine in each unit a 2½ kW mercury vapour lamp with two 1½ kW tungsten lamps to provide colour correction. The assembly plant includes a tank capable of taking the largest transformer. It can be sealed so as to permit of evacuating the transformer and filling under seal. Members had an opportunity of seeing in this shop an interesting design of transformer for the Dominions. This consisted of a bank of single-phase units, wound so that they could be used on either 110 or 210 kV, the tanks having a door at the side to facilitate loading. This can be seen in a photo on page 514.

Members were then invited to lurch at Cotton House which is a hostel for B.T.H. apprentices. Members were welcomed by the Managing Director, Mr. E. H. BALL, and Mr. J. W. LEACH, Chairman of the Section, replied.

During the afternoon a visit was paid to Warwick Castle, and in the evening members had an opportunity of attending a performance of *King Lear* at the Memorial Theatre.

Aluminium Fabricating

Saturday morning was devoted to a tour of the Banbury Works of the Northern Aluminium Company, and it is interesting to note that this coincided with the official opening of the continuous rolling mill at this company's works which is described in the leading article in this issue. The Banbury Works is concerned solely with the fabrication of aluminium. Coke-fired reverbatory furnaces are used for casting the aluminium into slabs which are hot rolled and subsequently cold rolled to varying thicknesses. A considerable proportion of the metal is used for the preparation of blanks for the manufacture of utensils.

Saturday afternoon was free and in the evening a dance was held which, despite the historical background, lacked nothing in liveliness.

The final day, Sunday, was devoted to a motor coach tour of the Cotswolds, with the weather making an unsuccessful effort to damp the spirits of the party. Lunch was held at the Farncombe House Country Club, as guests of the Midlands Electricity Board.

Welcoming members of the Section, the Chairman of the Board, Alderman W. S. Lewis, had some forthright things to say on agitation against overhead lines in rural areas. He spoke of the great progress of the Board, mentioning that for the year 1949-50 over 4,300 million units were sold, and in the first four months of the current financial year the increase was 16% on the corresponding period last year. Mr. J. W. Leach thanked the Midlands Board for their hospitality and paid tribute to the I.E.E. staff's work in organising the visit. Afterwards the tour of the Cotswolds continued and at Stratford-on-Avon the party split up at the conclusion of another successful Summer Visit.

Left, Sir Archibald Gill. Right, Mr. G. D. Arden.

I.E.E. 1950-51

Brief notes on the new president sections and

THE next few days will see the opening of the 1950-51 session of the Institution of Electrical Engineers (the presidential address will be given next Thursday but many local centres start earlier). For the guidance of our readers we give below some brief notes on the background of the new president and of the chairmen of the various sections and local centres. This session's president, Sir Archibald Gill, B.SC.(Eng.), M.I.E.E., F.I.R.E., has, apart from early training with Yarrow and Co. Ltd. and a short period with the British Thomson-Houston Co. Ltd., by whom he was employed in the designing of steam turbines, has spent a lifetime of service with the Post Office, being now assistant director-general (engineering) and engineer-in-chief.

The speciality of Dr. G. A. V. Sowter, PH.D., B.SC.(Eng.), M.I.E.E., chairman of the Measurements Section, is metals. Employed by the Telegraph Construction and Maintenance Co. Ltd. since 1922 he has been associated with the production and applications of Mumetal, Radiometal and other high permeability alloys, and has carried out research work on submarine cables, terminal apparatus and acoustics. Apart from being manager of the Metals Division of T. C. and M., he is a director of two subsidiaries, Transformer Steels Ltd. and Telcon Magnetic Cores Ltd. He is also alternate director of Temco Ltd.

Chairman of the Radio Section is MR. C. F. BOOTH, O.B.E., M.I.E.E., also a Post Office man, who entered the radio branch in 1923, and since 1948, has been in charge of the Radio Development Laboratory with headquarters at Dollis Hill. His particular contributions to radio development have been concerned with frequency standards and measurement, quartz clocks, and with the application of piezo-electric crystal units to frequency selection and control.

The Supply Section's new chairman is MR. S. E. GOODALL, M.SC.(Eng.), M.I.E.E., for the past four years chief engineer to W. T. Henley's Telegraph Works Co., which company he only joined in January, 1944, as assistant chief engineer. Educated at Queen Mary College, University of London, he served in the Apparatus Department of Siemens Bros. and Co. at Woolwich from 1924 to 1928, in which year he joined the Research Department of the Metropolitan-Vickers Electrical Co. Ltd., staying there till the end of 1943.

For the chairman of the Utilisation Section we turn to the electrical side of the aircraft industry —MR. A. N. IRENS, M.I.E.E., A.F.R.AE.S., who, apart from being chief electrical engineer to the Bristol Aeroplane Co. Ltd., is a part-time member of the South Western Electricity Board, and also carries on a consulting practice under his own name, dealing with electrical, heating and mechanical work.

Turning to the local centres, the chairman of the Western Centre, MR. G. D. ARDEN, M.I.E.E., F.I.PET., ASSOC.MIN.E.M.E., is power engineer to National Oil Refineries Ltd. (a subsidiary of Anglo-Iranian Oil Co.) at the Llandarcy oil refinery, South Wales. After experience in the supply industry at Exeter and Southampton, he was assistant electrical engineer attached to the Air Ministry from 1918 to 1920, and in the latter year became chief electrical engineer with engineering consultants in London dealing particularly with coal mining and paper mills for India. He took up his present position in 1926.

One of five representatives of the supply industry among the local chairmen, MR. H. G. BELL,

Below, left to right, Messrs. R. P. Watson, G. A. V. Sowter, C. F. Booth, A. N. Irens, and S. E. Goodall.

SESSION OPENS

and chairmen of the various local centres

Mr. J. Eccles and right, Mr. H. G. Bell.

M.SC.(Tech.), M.I.E.E., chairman of the North Western Centre, is manager of No. 1 sub area of the North Western Electricity Board. Prior to vesting day he had been chief engineer and manager to the Stretford and District Electricity Board.

The chairman of the Merseyside and North Wales Centre, Mr. J. ECCLES, M.M., C.B.E., B.SC., M.INST.C.E., M.I.E.E., M.I.MECH.E., really needs no introduction to our readers, for apart from being chairman of the Merseyside and North Wales Electricity Board, and a part-time member of the Central Authority from 1948 to 1949, he was a member of the Organising Committee under the 1947 Act, and city electrical engineer of Liverpool from 1943.

Another Post Office engineer, MR. W. F. SMITH, B.SC.(ENG.), M.I.E.E., is chairman of the North Midlands Centre. He is now chief regional engineer, North Eastern Region, at Leeds, after serving as regional engineer in the region from 1937 to 1946.

The chairman of the East Midland centre, MR. R. C. WOODS, M.I.E.E., M.I.R.S.E., is also a telephone man, having been with Ericsson Telephones Ltd., at Beeston, since 1919. For the past two years he has been assistant head of research (administration) of the firm's reorganised laboratories. Keenly interested in safety problems, for nearly 30 years he has done research and development on apparatus for mines, h.t. protective gear, etc. He has also been closely associated with the firm's engineering training scheme since its inception in 1929.

Another well-known representative of the supply industry is chairman of the South Midland centre. MR. D. H. KENDON, B.SC.(ENG.), M.I.E.E., deputy chairman of the Midlands Electricity Board, who for nine years prior to vesting day, was general manager of the Shropshire, Worcestershire and Staffordshire Electric Power Co.

A specialist in overhead line technique—MR. P. J. RYLE, B.SC.(ENG.), M.I.E.E.—is chairman of the North Eastern Centre. He has been on the staff of Merz and McLellan since 1924, for many years past as chief overhead transmission engineer. He has presented a number of papers on kindred matters both before the I.E.E. and C.I.G.R.E., and served on technical committees dealing with transmission subjects. Unfortunately, we have been unable to obtain a suitable photograph of Mr. Ryle.

A further supply industry representative—MR. J. HENDERSON, M.C., B.SC., A.R.T.C., M.I.E.E.—is chairman of the Scottish Section. He is, of course, chief engineer to the South West Scotland Electricity Board, and, from 1944 to 1948, was deputy engineer and manager to the Ayrshire Electricity Board. He has been engaged in the supply industry in Scotland since 1919.

The chairman of the Southern Section—MR. R. E. S. SOPER, B.SC.(ENG.), M.I.E.E., of Pirelli General Cables Works Ltd.—has a long association with the cable industry. He joined the Telecommunications Department of that firm in August 1924 as cable tester on the installation staff, transferring to the works the following year to study cable design and manufacture. He later became chief cable engineer and then deputy chief engineer of the Department.

MR. R. P. WATSON, B.A., M.I.E.E., chairman of the Northern Ireland centre, has been sales engineer responsible for the Installation and Sales Departments of the Belfast Corporation Electricity Undertaking since 1939. He originally joined that undertaking as a mains assistant.

Below, l. to r., Messrs. W. F. Smith, R. C. Woods, D. H. Kendon, J. Henderson, and R. E. S. Soper.

Problems and Practice
IN ENGINEERING

Run-On Motor

WE have on our plant a number of vertical tapping machines, each driven by a 3 h.p. 3 phase s.c. motor and controlled by a mechanically operated change-over switch with three positions—"forward," "reverse" and "off"—the switches being operated by cams mounted on a disc driven through a clutch by the gears controlling the spindle traverse.

Investigation of a complaint that one of these tappers "wouldn't work" revealed a broken shaft in the change-over switch, and as this was obviously going to take time to repair, the man was told to borrow a switch from a new machine awaiting installation in the line, this being quite a simple matter as, contrary to general practice, the machine tool manufacturer had put the switches in a very accessible position and also, wonder of wonders! suppl ed plug-in positions on both supply and load sides.

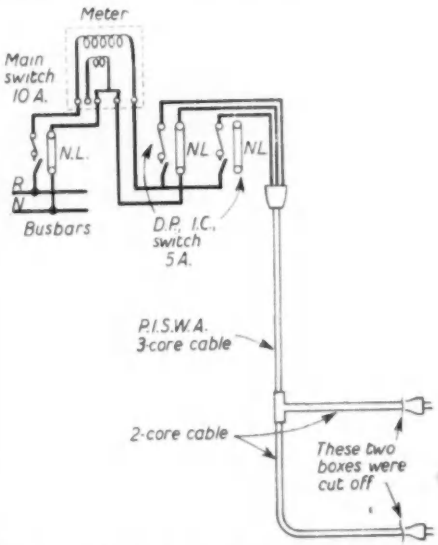
After a while he returned to the office to report that although the new switch seemed to be operating perfectly, the motor refused to stop except by the interruption of the supply through the main switch.

Asked what he had done, he replied that he had installed the switch as usual, without inspection as that seemed unnecessary, switched on and started the machine. It did a normal full cycle with the exception that when the change-over switch went into the "off" position, the motor just continued to run. Withdrawing the "load" plug he tested across phases and got no supply, so, by hand, he operated the switch, testing each position—"forward," full supply, "reverse'," full supply, "off," no supply; thinking he "must have dreamt it," he decided to try it out again, and had noticed that the motor did not start up when supply was renewed until the machine was started in the proper manner, but, having done a full cycle, still constantly refused to stop. Knowing the man concerned as generally a thoroughly reliable chap, the writer thought this phenomenon worth viewing, and sure enough the machine did exactly as described and the tests taken were just as he said, but —a test to earth showed one phase alive. The switch manufacturer had altered the design and in doing so had been forced to change to a 2-phase instead of 3-phase break. Inspection of the motor terminal block revealed the cause of all the trouble; a terminal block fixing screw had become loose, dropped out and earthed the star connecting link to the case of the machine; this had caused no trouble with the old 3-phase break, but with the new switch leaving one phase on and the motor already rotating, we had a single-phase motor, the output of which was surprising.

Removal of the screw cured the trouble and everybody was happy except the tool-setter, who just couldn't see how the removal of a screw from the motor could cure a fault caused by a new switch.—*G. N.*

Cable Testing Fault

THE importance of disconnecting both ends of a cable when making tests can be overlooked, and usually results in incorrect conclusions being drawn with unfortunate results as the following incident proves. I happened to be on leave when the usual routine insulation



Cable circuit details showing reasons for the bad test

tests of cables was due and on resuming duty was informed that a three-core cable from a distribution board feeding station lights had given a zero test between cores and to earth. Two outdoor joint boxes had been cut off in an endeavour to improve the test but without success. In response to my query as to whether the cable end in the distribution board had been disconnected, I was told that the main switch controlling the circuit had been put off. A check-up revealed that the test had been made without disconnection of the cable and also with two switches on and a single-phase meter in circuit! I need hardly mention that the air was slightly blue when all these facts came to light.—*W. H. Gatehouse.*

Fitting Tight Bearings

UNDER this heading in your issue of February 23, a roller bearing which was too tight to knock on a shaft was warmed on a stove and shrunk on. This may be permissible in an emergency when time presses, but it is bad practice. The writer has removed a number of tight bearings. Usually it was necessary to split the bearings in halves with a cold chisel.

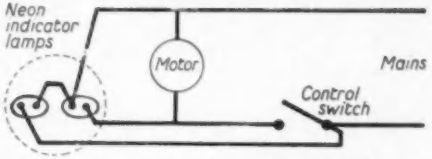
In several cases easing the journal (lapping with emery cloth) led to cool running bearings after previous heating troubles.

A bearing has a specified clearance which is reduced if forced on an oversize journal. The new bearing should be tried on the journal. If too tight to tap on appoximately half-way with a hammer and a suitable tube, remove it and carefully ease the journal with a fine flat file, finish with a fine grade emery cloth. Finally, tap home with hammer, using a tube the diameter of inner race. If there is a possibility of damage to the rotor or an existing bearing *in situ* with the hammer method the bearing can be immersed in *warm* oil and pushed home. When removal is necessary warm oil can be applied to the outer race. Ball and roller bearings are very reliable components but do need renewing occasionally. This should be borne in mind when fitting bearings.—*W. A. H.*

Indicating Refrigeration

ELECTRICAL contractors coming across complaints of ice-cream or frozen-food conservators being rendered inoperative for some time through an unnoticed blown fuse, thereby rendering refrigeration ineffective and resulting in some spoilage of the foods in store, may easily install a system of indicators that will both enable the user to ascertain when current is available at the motor and control switch, and also permit of an easy check of operating times, by the simple installation of two neon indicator lamps mounted on the wall in an easily visible location.

The wiring diagram shows the simple connections. Neon lamp on left glows at all times when current is available at the machine, and the one on the right glows only when the switch is closed and the motor running.—*Ben Quarmby.*



Neon indicators wired for refrigeration control

Shorted Resistance

A CUSTOMER rang up to say that his planer, operated by a Ward-Leonard set, was giving trouble.

On arrival at the works we found that when the set was started by the main 3-phase motor, and the generator had built up, the contactor for the main d.c. planer motor immediately pulled in, without the start button being pressed. The leads from the controller panel to the push button stations were disconnected and the fault disappeared.

This ruled out any likelihood of a short due to tracking at the back of the panel and indicated trouble on the external part of the control circuit. A thorough examination of the three push button stations and the connecting wiring did not reveal any fault; therefore we had to revert to other possible sources of trouble.

Closer examination of the back of the panel showed that the design of the contactor circuit was to have the generator mains permanently connected across the coil, with a resistance in series, high enough to prevent sufficient current flowing to draw in the contactor. Pressing the start button shorted out this resistance and fully energised the contactor coil.

A short had developed on these resistance tubes, and after re-winding them and fitting back in the controller everything was working normally.—*P. K. S.*

Contributions to this page dealing with specific items of interest to electrical engineers and maintenance men are welcome, and, if accepted, will be paid for at our standard rates. Contributions should be written on one side of the paper only and may be accompanied by sketches, which will be re-drawn for publication.

The President and Council

A. P. L. E.

Further Proceedings at Bournemouth

FOLLOWING the presidential address and the official visit to the exhibition (reported in last week's issue) the first technical session took place on Tuesday afternoon, in the form of a discussion on the draft Code of Practice CM(LGE)3674. In his opening address, Dr. J. W. T. Walsh, M.A., D.SC., M.I.E.E., commenced by reminding delegates of its origin. Attempts to formulate a standard specification based on the M.o.T.'s departmental committee report of 1937 had been started soon after the report was issued and, interrupted by the war, had been re-commenced in 1944-45. Criticism received of a draft specification had proved that a rigid specification was impracticable but that a code of practice, giving general guidance, was not only desirable but essential. Based on the 1937 report—a long time ago by the calendar but not so far away in the history of street lighting progress, the code focused attention on certain points requiring clarification, in addition to giving general guidance and recommendations.

Light Distribution

An example of a situation which had required clarification was the light distribution from lanterns which were frequently referred to in vague terms such as "semi-cut-off" and the like. The drafting committee had felt, however, that although cut-off and non cut-off types could be sharply segregated, it was impossible to draw a hard and fast line between the high-angle and medium-angle types of non-cut-off lanterns, since they only represented two points on a scale of infinite variation. The definition of a cut-off lantern adopted was one which emitted a negligible amount of light above 80° from the downward vertical. Lanterns emitting one-third to one-half of their maximum intensity at high angles (i.e., up to 86°) were classified as high angle, while those where the maximum intensity occurred at about 75° and fell off quite rapidly nearer the horizontal, could be defined as medium-angle type. But it was impossible to lay down a hard line of demarcation.

Reviewing the recommendations on mounting and spacing of lanterns, Dr. Walsh pointed out that they had gone a little further than the M.o.T. report, instancing the substitution of 44 ft for the previous figure of 40 ft as the maximum spacing between rows, this being more convenient for the highway engineer.

Glare

Certain modifications had been made in the definition of the "directional intensity ratio" which was now defined as the ratio of the peak intensity in any direction/average intensity in the lower hemisphere, which latter expression was, of course equal to the total flux in the lower hemisphere/6·28. For lanterns intended for traffic routes the d.i.r. should not exceed 6 (and, preferably, not exceed 5) for lanterns having non-axial distribution in the horizontal plane (i.e., 160° beam). In addition the peak intensity should in no case exceed 6,000, and preferably not exceed 5,000, candles.

Other examples of the advantages of a code over a specification were then dealt with. Even for the lighting of a straight road, it was preferable to indicate good practice rather than lay down hard and fast rules, while junction lighting, and roundabouts in particular, gave other examples. He was quite sure that the last word had not been said on roundabout lighting. In conclusion he said that the committee looked forward to receiving comments from members of the Association. During the process of drafting the code, it had been an education to attempt to reconcile the many conflicting points of view.

DISCUSSION

OPENING the discussion, MR. J. G. HOLMES (Holophane Ltd.) said that the order of importance of the three fundamentals of good

practice were: (1) siting of lanterns, (2) light distribution, (3) colour and quantity of light, and the relative accuracies required were in the ratio of 10%, 20% and about 30%. While the code contained an admirable exposition of the siting of lanterns—he hoped it would come to be regarded as a text book on the subject—it contained nothing on the relative merits of gas and electricity; nothing on the colour of light; and nothing on the question of quantity of light—in fact, nothing to guide the impecunious council hoping for instruction on these matters. Slides were shown to illustrate the effects of colour and intensity on lighting schemes and an amusing note was struck by reproduction from a manufacturer's catalogue of 1925 giving recommended intensities practically identical with modern ideas on the subject, to dispel any illusions that "streets were much better lit nowadays." He was also of the opinion that fluorescent lamps should be covered by a supplementary code at the earliest possible moment—there were many technical problems which merited attention.

Pleading for more accurate definitions, he felt that there could be precise distinction between high-angle and medium-angle distribution, and gave suggested figures. In his opinion the peak intensity was not sufficient for accurate definition. He was anxious that the onus of interpretation should not fall on the manufacturer.

MR. C. R. BICKNELL (Siemens) referred to Dr. Walsh's remarks regarding "minor departures" from the 1937 report. The shortening of distances between lanterns from 150 to 120 ft, however, increased the cost of schemes by about 20%, and in his opinion, economic considerations demanded reconsideration of this point. 150 ft was, he considered, good practice. He also made minor criticisms of the rules for spacing between rows, and the fact that nowhere did the code specify that illumination values should be the average throughout lamp life.

MR. R. R. H. MATTHEWS (N.W. Elec. Bd.) looked forward to an early issue of a companion code for Class B roads. He felt that the code should give a list of definitions. Nationalisation had resulted in the engineer dealing with a number of different lighting authorities and instanced the confusion between "lamps," "lanterns" and "reflectors".

In reply, Dr. Walsh referred to the question of light and colour. There had been a great deal of wishful thinking but no scientific evidence to show that—given comparable conditions—the colour of the light had any significance in determining visibility. Definitions, lighting hours and the question of electricity v. gas were outside the scope of the drafting committee's terms of reference.

A further feature of Tuesday's proceedings was a demonstration by Erecon Ltd. of the erection of a concrete pole. The technique utilised a tubular steel strong-back to give a two-point lift to the pole when removing from the lorry, thus keeping bending moment to a minimum and avoiding hair cracks.

Lighting as an Amenity

"Street Lighting as a Public Amenity" was the title of a paper given by MR. E. B. SAWYER (Manager, Lighting Service Bureau) on Wednesday afternoon. Admittedly designed to provoke discussion, this paper dealt with the art of public lighting from viewpoints other than as an adjunct to modern traffic, on which he believed too much emphasis had been placed. There had been a tendency to subjugate everything to the actual function of lighting the roads, and appearance and decorative qualities had received too little attention. In consequence, there were some terrible examples to live down. More attention should be paid to "street furnishing."

As in all questions regarding an art—as opposed to an exact science—there was difficulty in laying down hard and fast rules. In many cases, existing rules could be broken with good effect, and several examples were shown in the form of slides.

Costs

Although the question of rates was of vital concern to the ratepayer, he felt that the public should appreciate that street lighting costs, on an average, less than 9d. in the £ and, if the lighting were poor, a very modest increase would give a great improvement. Figures given in Table 1 show that the average rate for lighting is from one-sixth to one-third of the cost of highways and bridges, and is less than that for parks and pleasure grounds. The figure of £100 million a year had been

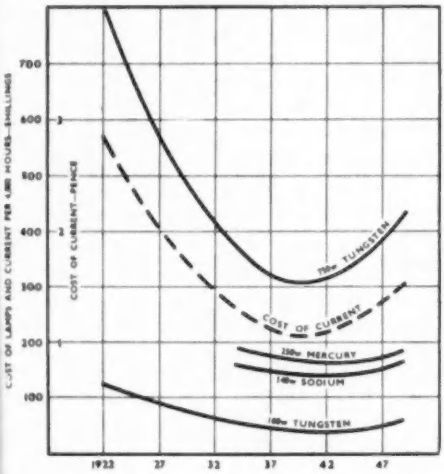
"Street of a Thousand Lanterns" - The outdoor exhibition

Table 1. Average Rate Levied.

Year	County Borough		Metropolitan Borough		Non-County Borough		U.D.C.	
	Public Lighting s. d.	Highways and Bridges s. d.	Public Lighting s. d.	Highways and Bridges s. d.	Public Lighting s. d.	Highways and Bridges s. d.	Public Lighting s. d.	Highways and Bridges s. d.
1926	0 5·5	2 0·1	0 2·7	1 2·2	0 5·3	1 8·3	0 5·0	1 6·3
1938	0 6·3	2 2·5	0 2·9	0 11·8	0 4·8	1 1·5	0 5·5	1 3·0
1950	0 9·6	2 9·71	0 6·6	2 2·9	0 8·24	4 2·63	0 8·28	4 3·01

quoted as the compensation paid by insurance companies for road accidents, and he felt that lighting could make a contribution to the reduction of this sum, which would be reflected in the cost of policies and consumer goods.

Because of the improvements in efficiency of light sources and equipment, public lighting of a given standard costs relatively little more than in pre-war days, and he gave diagrams showing how the average running cost and the cost of lamps had varied over a number of years, these being based on 4,000 hours/annum. If, he pointed out, efficiency had not been increased, the present standard of lighting would cost five times the 1922 price.



Variations in average running cost 1922–1948

Fluorescent Lighting

Fluorescent street lighting was often opposed on the score of capital cost. With concrete poles, fluorescent lighting costs approximately £3,300 per mile to Group A standards and with steel poles, £3,000 per mile. The average annual cost per mile for fluorescent, mercury, sodium and tungsten given in Table 2 are based on a loan period of 15 years at 2½%, annual burning hours of 4,000 (except for fluorescent where two lamps are switched out at midnight, where 2,000 hours is assumed), £88 per mile for maintenance on all systems, and current at 1·25d./kWh.

The paper concluded with a demonstration of decorative lighting effects, including an interesting comparison between the efficiencies of green fluorescent tubes and colour-sprayed tungsten, one 100 W tube (including choke losses) being equivalent to twenty 100 W tungsten lamps.

DISCUSSION

Mr. E. J. Cook (N.W. Electricity Board) instanced the financial difficulties in which a small U.D.C. might find itself when responsible for a section of Class A highway, and the need for new administrative arrangements. He queried whether the servicing costs of different systems were, in fact, the same.

Councillor H. Eastwood (Manchester Corporation) thought that fluorescent lighting had opened up new vistas. The lighting engineer had many responsibilities, and what he called "anterior" lighting, due to shop windows, neon signs, and car headlights, was complicating the problem.

Mr. C. O. Innes-Jones (Leamington) felt that more attention should be paid to daylight appear-

Table 2. Approximate Average Annual Cost Per Mile Class A, M.O.T. Standard (Concrete Columns).

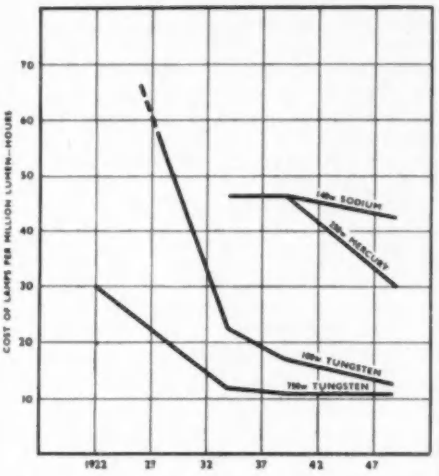
	Fluorescent		Mercury	Sodium	Tungsten
	3 × 80 W *full operation*	3 × 80 W *Two lamps half night operation*	250 W	140 W	*filament* 750W
	£	£	£	£	£
Capital replacement ...	267	267	180	181	156
Lamp replacement ...	100	66	102	153	96
Starter replacement ...	13	8	—	—	—
Power	272	182	242	146	685
Servicing	88	88	88	88	88
	£740	£611	£612	£568	£1,007

ance and referred to "bleached pine forests."

Mr. C. G. SMALL (E. Midlands Electricity Board) and another delegate questioned whether the figures quoted gave a true comparison. Mr. Small also pleaded for greater co-operation between lantern and column manufacturers.

MR. E. C. LENNOX (Sunderland) was of the opinion that efficiency did not lie in getting the same amount of light for less money—the aim should be towards more light.

Mr. V. W. DALE (E.D.A.) endorsed the author's view that some public lighting fittings were monstrosities. At the same time, he sympathised with the designer whose columns were expected to be an amenity by day as well as being useful at night. He suggested that a competition for new designs should be held at national level. So far as quality of street lighting went, it was a regrettable fact that there were areas even in the heart of London which could be quoted as examples of street lighting as a public enemy, not an amenity. There were many areas in what he termed "Darkest England" where the authorities were apparently content with installations reminiscent of the 18th century, unworthy of the 19th, and utterly intolerable in the 20th.



Variation in cost of lamps to provide given quantities of light

Road Safety

Thursday morning was devoted to hearing a paper "Some Problems in Road Safety connected with the Lighting of Streets" by A. J. HARRIS, B.SC., of the Road Research Laboratory (D.S.I.R.).

This being the first A.P.L.E. paper by a member of the laboratory's staff, it was a convenient occasion to introduce the aims and work of the establishment. Originally set up for research into materials and methods of road construction, the terms of reference were enlarged in 1946, to include road safety and traffic flow with sections on traffic, surface characteristics, vehicles, road users, lighting, and statistics. Problems selected for immediate research include brakes, surface slipperiness, vehicle lights and dazzle elimination, and the improvement of pedestrian crossings. Long-term research aims at an understanding of the factors affecting traffic flow, vehicle performance and road user behaviour, their interrelation, and how they affect the number, type, and severity of accidents.

Revealing Power

Dealing with the work of the lighting section, Mr. Harris discussed the problem of assessing visibility, and chose for close attention the method due to J. M. Waldram known as "revealing power". Difficult to define exactly and simply, a crude definition is the chance (expressed as a percentage) of seeing an arbitrarily-chosen pedestrian against the background of the road surface. This can be obtained from measurements which are purely physical, i.e., the brightness of the road surface (in foot-lamberts) and the illumination of vertical surfaces in the street (in lumens/sq ft), it being borne in mind that the figure is by no means a constant for any given road, but varies considerably from point to point. Curves were shown for the revealing power plotted against background brightness/average vertical illumination, for values of road brightness from 0·0026-0·8 foot-lamberts, these showing that the increase of revealing power for a given increase in brightness gets less and less as higher brightnesses are reached.

Other interesting results were given in a set of curves showing the effect on revealing power of reducing the lighting by 75% or reducing the reflection factor by the same amount, which emphasises the importance of the reflection factor of the road surface used.

Pedestrian Crossings

Experimental work on pedestrian crossings was then described by Mr. Harris, and some exceedingly interesting results were given regarding optimum pattern of pedestrian crossings and the effect of floodlighting them. Since the motorist does not get a plan view of the crossing, but one so considerably foreshortened that a 10-ft wide crossing appears the equivalent of a 2-in. high vertical projection, the "zebra" or plain stripe pattern is superior to chequer-board or diagonal stripes. Flood-

lighting of the crossing can be remarkably effective in increasing the distance at which it is first seen but, here again, road surface had a considerable influence. Paradoxical as it may seem, the dark areas are more important than the light areas. Shiny black surfaces may appear brighter than white surfaces of rougher material, and it seems that the surface texture is all-important.

Results obtained with patterned surfaces to modify reflective properties to maintain efficiency under rainy conditions.

The paper concluded with a brief statistical survey of the effect of markings, floodlighting and illuminated beacons on the behaviour of both drivers and pedestrians.

DISCUSSION

MR. S. R. GEARY (chairman, National Safety Awards Committee) gave figures of the proportion of fatal accidents during the hours of darkness, to emphasise the importance of the subject of the paper. He regretted that the author had not dealt with the effect of excessive foreground brightness and glare. Most modern street lighting was, in his opinion, prone to faults in this respect.

MR. J. M. WALDRAM (G.E.C. Research Laboratories) welcomed the advent of the Road Research Laboratory into the realms of lighting. He wished them well, although he felt that they were unduly optimistic in setting down the matter of headlight glare as a short-term problem, it having exercised a good many first-class brains for some thirty years or so. At the same time he also assured the previous speaker that the problem of glare from street lighting had not escaped attention. It was probable that no one would ever succeed in assigning numerical values to visibility —quality, unlike quantity, was not susceptible of easy measurement. He would congratulate the author on his neat approximation for revealing power, but would point out that the value brightness/vertical illumination does not usually fall below 0·1-0·2 in most of important parts of streets, and confirmed the conclusion that revealing power was not affected by brightness.

Referring to the "reverse silhouette" effect, he pointed out that as the illumination of the object increased it became vague and shadowy until it became brighter than the road surface. There was a range of illumination of about 4-1 over which it was difficult to see the object at all. Unidirectional lighting had been born as a result of the revealing-power theory. He referred to the enormous help which could be given by road surface engineers—rough and dark surfaces seriously impaired lighting efficiency.

COUNCILLOR W. EDGE (Worsley U.D.C.) thought that the public lighting engineer and the automobile lighting expert were working against one another—one was attempting to silhouette objects by contrast against road brightness while the other, by illuminating the objects, reduced the contrast.

Other points raised in discussion were the importance of good maintenance of crossing lighting, and the stimulus provided to peripheral vision by contrast between natural and monochromatic lighting.

The Luncheon

Thursday's proceedings included the annual luncheon, held in the Pavilion, and attended by a large number of delegates and their ladies. Following the loyal toast, Mr. A. S. TAPSFIELD (immediate Past-President) proposed "The County Borough of Bournemouth" in an amusing speech which he described as his swan song, since, as he remarked, "there is nothing so ex as an ex-President."

Replying, Councillor S. A. THOMSON, J.P., the Mayor, mentioned his pleasure at the presence of so many delegates from local authorities, and hoped that they would convey Bournemouth's greetings to their own Councils. On the subject of the Association's work, he pointed out that well-lit roads were a powerful deterrent to crime and accidents. As Mr. Tapsfield had stated, this was the third time the Association had visited Bournemouth, and he hoped to have the pleasure of welcoming them again when next they were able to come south.

In proposing the toast of "The Association of Public Lighting Engineers," LORD LUCAS OF CHILWORTH (Parliamentary Secretary to the Ministry of Transport) mentioned the high regard in which the Association was held, not only by the Minister, but by all in the Ministry. Safety on the roads was one of the great problems of the day and, as Parliamentary Secretary, was his own special concern. The problem could only be solved by the awakening of the civic conscience and by the work done by scientists in such bodies as the Association. It was of interest to note that as many as 120 Group "A" schemes were before the Ministry at once.

Mr. P. RICHBELL, the President, in the course of his reply read a telegram from the Private Secretary in answer to a loyal telegram dispatched to His Majesty. He also extended a welcome to the overseas delegates, and thanked Mr. E. EVANS (Secretary A.P.L.E.) for his indefatigable efforts in assuring the smooth running of the Convention.

The toast of "The Guests" was proposed by Mr. H. PRYCE-JONES (Vice-President A.P.L.E.), and Mr. W. K. HUTCHINSON (Chairman, South-Eastern Gas Board) made suitable reply.

Thursday afternoon was left free for delegates to re-visit the exhibition, and the Presidential Reception was held on Thursday evening. On Friday morning the last paper of the meeting was given on "Design and Performance of Acrylic Plastic Street Lighting Equipment" by P. H. COLLINS, H. P. WALKER and W. E. HARPER, B.SC.(ENG.), PH.D., A.M.I.E.E., of Imperial Chemical Industries Ltd.

Properties of Acrylics

Polymethyl methacrylate (better known as "Perspex") has many good points for use in lighting equipment, such as excellent optical characteristics; freedom from weathering and corrosion; lightweight, strong and shatter-resistant; immunity from fracture by thermal shock; and ease of fabrication and moulding. It has, of course, one major handicap in that, in common with other thermoplastics, it is liable to softening and de-moulding with higher temperatures than about 70-75° C. Attempts have been made to modify the thermal properties of methacrylate so as to raise the demoulding temperature, but increased temperature resistance has, so far, only been obtained at the expense of its other properties.

The paper dealt very fully with the design problems involved from mechanical, thermal and optical points of view, and gave interesting results of tests carried out, in addition to a review of shaping processes and design data.

Service performance was also reviewed, including tests on abrasion, discoloration under ultra-violet light, resistance to tropical sun. Summarising, it was considered that the major use of unmodified methacrylate would be in sodium or fluorescent fittings, although its use in conjunction with filament lamps was increasing, and designs for mercury lamps were proceeding. An interesting suggestion was the use of a completely sealed fluorescent unit which would only need breaking down for re-lamping once per year. This is, of course, contingent upon the life of fluorescent tubes being extended to 5,000 hours.

Friday afternoon was devoted to an open forum for free discussion.

Lighting Accessories

Census of Production measures thirteen years' advance

MANUFACTURERS of electric lighting accessories and fittings and electric bell apparatus form the subject of Preliminary Report No. 69 of the 1948 Census of Production, which has recently been issued by the Board of Trade. Leading statistics for the years 1935, 1937, 1946 and 1948 are presented, covering a period during which the number of establishments involved in this class of business has increased from 64 to 135.

Money values have changed considerably during this period and so the successive values of production of £2·1, £3·7, £8·6 and £13·2 million for the years stated have to be treated with caution. Probably the 1948 figure represents a volume of production about one-and-a-half times that in 1937. Numbers employed in the trade have risen in the order 6,268, 9,673, 12,671 and 14,622, which again gives a 1948 figure 1·5 times that of 1937. The productivity of the trade may be better evaluated, however, by considering the net value of production, after allowing for the cost of materials, fuel and electricity used, and the amount paid for work given out, which totals amounted to 48%, 46%, 39% and 42%, respectively, of the value of production. The resulting net outputs for the four selected years are thus £1·1, £2·0, £5·1 and £7·5 million, and the net output per person employed becomes £176, £205, £401 and £510.

Staff

The change in numbers employed in the trade is noted above, but a more detailed analysis is given in the report which shows that the number of operatives in 1948 was 142% of the 1937 total, while the corresponding ratio for administrative, technical and clerical staff was 220%. In 1948 the remuneration of the operatives accounted for £2·8 million of the £3·9 million total salaries and wages, showing an average of £234 per employee as against £433 for the "staff" categories.

Capital expenditure during 1948 is represented by the acquisition of £247,000 of plant, machinery and vehicles, a value partly offset by £57,000 worth disposed of. A further capital cost of £96,000 for new buildings and extensions (excluding site values) gives a resultant expenditure of £286,000.

It should be noted that only establishments employing ten or more persons on average during the reference year are covered by the census, and the statistics are further restricted to those engaged wholly or mainly in the work described at the beginning of this article.

overseas news

New Swedish Station

The formal inauguration of the first stage of the Holleforsen hydro-electric power plant on the Indal River in northern Sweden, was attended by many prominent Swedish officials earlier this month. The stage completed has two generator sets, and a third set is to be installed in 1952, when the station will have a capacity of 145,000 kVA. An unusual feature of the station is a winter garden adorning one wall of the subterranean generator hall. This is the fourth major power plant in the province of Jemtland operated by the State Power Board.

W. A. Plan

It is hoped to call tenders next year for the first section of a new power station at Bunbury, Western Australia, with an ultimate capacity of 200 MW, the Minister of Electricity, Mr. Brand, stated a few days ago. The Bunbury station is to be connected to the Perth Metropolitan system. A site has been selected, test bores have been drilled, and a start is soon to be made on the design of the station. Mr. Brand referred to a report submitted by the State Electricity Commission on planning for the years ahead. The capacity of the plant now installed at the East Perth station was about 51,000 kW, and the new Fremantle plant would be of 100,000 kW. It was intended later to scrap the old machines at the East Perth power station and in their place put a new 25,000 kW 50-cycle turbo-alternator. It was also proposed to replace the existing 25,000 kW 40-cycle turbo-alternator with a 50-cycle set of similar size. The maximum load at present, including an allowance for existing restrictions, was 58,000 kW. The expected annual increase in maximum load was about 10%. Thus the East Perth and South Fremantle stations should be able to meet requirements for the next seven years with a margin of 25% to cover repairs, breakdowns, etc., he said.

One Way Out

Hampered for a long time by a decline in the quality of coal supplied to its stations, the City Electric Light Co., Brisbane, has decided to open its own coal mine in the West Moreton district. Since the war that district has not been able to boost output and keep pace with growing demands and the company, along with other important consumers, has had to pay at least double the usual prices for a supplementary supply from Callide. It is expected that the undertaking will apply modern techniques to the production of coal from its West Moreton seams.

New Power Line

Construction of a transmission line from Clermont to Blair Athol is contemplated by the State Electricity Commission of Queensland. Cost of the line, which would be 15 miles long, is £28,000, and a further £31,000 worth of plant will be required at Clermont.

Plant for Trevallyn

For the new Trevallyn power station, the Hydro-Electric Commission of Tasmania has placed an order with A.S.E.A., of Sweden, for three vertical 25,000 kVA generators. The first unit is scheduled to be delivered by the end of 1953.

Sales Tax

Many domestic electrical appliances are now subject to a 15% excise tax in Canada, but the list of items does not include large goods such as cookers, washing machines, or refrigerators. It is confined to articles regarded in the luxury class. Local dealers are hoping that the increase in price will not appreciably affect sales.

Lighting at Niagara

The first stage of the new street lighting for the town of Niagara Falls, involving 1,000 lights, is nearing completion. The programme, which cost nearly $100,000, is being undertaken by the Hydro-Electric Power Commission in conjunction with the city administration. Even so, the present scheme does not include most of the city's main streets. Many of the light standards on these streets are of the ornamental type. They cost $40 a year to operate, and if a motorist should knock one down, it costs him (or rather his insurance company) $200 to replace it. The most inexpensive lamp standard that can now be bought costs $90 locally, and even at that price would cost the city a considerable sum of money.

Quebec Line

The Quebec Hydro-Electric Commission has been authorised to construct a power transmission line from Amos in north-western Quebec to Senneterre, a distance of 46 miles. Cost of the line will be $750,000.

Canadian and Proud of it

Mr. R. H. Saunders, chairman of the Hydro-Electric Power Commission of Ontario, upheld the merits of Canadian engineers when speaking at the annual convention of the Georgian Bay Municipal Electrical Association earlier this month. He said he was sick and tired of hearing people say that some person born in another country must be better than a Canadian. The great majority of the Commission's engineers were Canadians, educated in Canadian universities. Of the 890 engineers employed, 820 were Canadians, while 55 generating plants had been built and designed by such men for the Commission.

Ontario in 1949

The year 1949 was a difficult one from the point of view of the Hydro-Electric Power Commission of Ontario, for there was a rather serious power shortage, yet considerable advance was made, details of which are given in a striking brochure, just received, on the activities of the Commission for that year. In less than 12 months emergency steam and diesel generators totalling 63,000 kW were brought into service. At October 31, 1949, the Commission operated 58 hydro-electric stations which, together with minor diesel stations, generated 9,450 million units during the 12 months. In addition, the Commission purchased 4,582 million units. With the emphasis on rural electrification, a further 35,206 new rural consumers were connected and 4,738 miles of rural primary line erected during the year; bringing the respective totals to 122,358 and 19,251. The year 1949 saw the initiation of the scheme for the standardisation of frequency in the Southern Ontario system, and of the commencement of inspection of transmission lines by helicopter—the Commission has plans in train to increase its 230 kV line to a total of 4,600 miles in length. Reference is also made to many of the new power projects—Tunnel, Pine Portage, Des Joachims, Chenaux, Clark Keith and numerous others, some striking photographs of which are included.

French-Spanish Exchange

Successful trials have been carried out for the exchange of electric power between France and Spain across the Pyrenees frontier. Normally, Spain is short of electric power in the summer, owing to the drought, and France lacks it in winter, and it is therefore proposed to make the supply of current reciprocal. Supply to the Spanish Iberduero Co. is made through Hendaye and Irun by the French Compagnie Nationale d'Electricite, from the Basses Pyrenees, near Toulouse. A high tension station at the frontier posts of Hendaye and Irun has a capacity of 10,000 kWh, and plant at Hernani (Spain) distributes current to Iberduero. Consumption is checked at the frontier, since electric current pays customs dues at the rate of one Spanish centimo per kW.

German Wind Power

Members of the West German Parliament are supporting a plan for the erection of 900 ft high windmills for the generation of electricity. The Bonn Government is to be asked what steps are being taken to support Herr Herman Honnef's experiments and to discourage him from emigrating.

Fan Market in Pakistan

During the preliminary investigations recently held by the Pakistan Tariff Commission into the question of protection for the local manufacture of electric fans, it was stated that local firms claimed they could produce 25,000 models a year—said to be more than the present demand. It was admitted that the quality of their products was inferior to that of imported electric fans, therefore the public preferred the latter even though they might be a little more expensive. The importers claimed that local production was nothing like adequate to satisfy the demand.

India's Fan Industry

The electric fan industry in India has also made rapid progress in recent years, and is in a position to meet the entire needs of the country, it is claimed. It may even be possible in the near future to export fans to neighbouring countries. According to the latest figures, production of fans in the first quarter of 1950 showed an increase of 25% over output in the corresponding period of 1949. For the six months ended June 30 last, 102,600 fans were produced, compared with 165,000 during the whole of 1949.

At present there are about 30 factories manufacturing electric fans on an organised basis. Their total capacity is stated to be 310,800 a year. The annual internal demand for ceiling and table fans is estimated to be 140,000 and 60,000 respectively. Eight firms are manufacturing on an average 1,000 carriage fans per month. The bulk of the raw material is indigenous. The foundation of the industry was laid in 1922 when a company was floated in Calcutta. In 1924 this was converted into a limited concern called "India Electric Works Ltd.," and was the first such local factory run on modern lines.

Lack of Engineers

The acute shortage of engineers in New Zealand was seriously hindering work on new power schemes, stated Mr. J. J. Hurley, a senior State hydro-electrical engineer, recently. Mr. Hurley himself is one of a group of New Zealand engineers who have been attracted to the Australian Snowy Mountains scheme and he revealed that his new post would be worth about £480 a year more than he received in salary in N.Z. He said also that his new post would be roughly a step above the one that he holds at present. He said the Public Service, the largest single employer of engineers in New Zealand—had done nothing effective to recruit or retain them. The shortage of engineers in the State Hydro-electric Department and the Ministry of Works today was more acute than it was in 1948, he said. The 1948 survey showed that in New Zealand there were 630 engineers to each 1,000,000 of population, compared with 700 in Australia in 1941, 795 in Britain in 1933, 1,800 in Canada in 1941, and 2,250 in America in 1946.

Kimberley Extension

Equipment to extend the capacity of the Kimberley power station from 13,500 kW to 20,000 kW, was expected to arrive from England before the end of 1951, Mr. H. J. de Villiers, manager of the Cape Northern undertaking of the Electricity Supply Commission of South Africa, stated earlier this month.

PERSONALITIES

IN THE INDUSTRY

A familiar figure for many years in connection with the negotiation of terms and conditions of employment in the electricity supply industry, **Mr. A. H. Banks,** O.B.E., is relinquishing his appointment as chief labour relations officer of the British Electricity Authority at the end of this month on reaching the retiring age. Mr. Banks' health has not been of the best just recently—he had a serious breakdown early this year, but recovered sufficiently to resume duties during the summer. Prior to vesting day he had been employers' secretary to the N.J.I.C. and the N.J.B. for the electricity supply industry since 1930, and, from 1938, employers' secretary to the National Joint Committee for local authorities and chief electrical engineers—which negotiated terms and conditions of the engineers' salaries.

Mr. A. H. Banks

Mr. G. W. W. Fore has been appointed secretary of Berry's Electric Ltd. in succession to **Mr. W. O. Diggens,** whose health has prevented him from carrying on his work in this capacity. Mr. Fore has been closely connected with Berry's since 1928, initially with the company's auditors and subsequently as accountant to the firm.

There was an informal gathering a few days ago at the power station now under construction at Canning Town to wish *adieu* to **Mr. G. D. Bendix,** who is retiring from the position of station superintendent at West Ham generating station, London Division, B.E.A., at the end of this month. Mr. Bendix went to West Ham in 1905, when the capacity of the station was only 5,700 kW, and he became station superintendent in 1925 when the capacity had increased to 37,000 kW. Today it is 120,000 kW. At the ceremony, under the chairmanship of **Mr. J. N. Waite,** M.I.E.E., F.Inst.F., divisional controller, London Division, many tributes were paid to Mr. Bendix's sterling qualities both as an engineer and a colleague. On behalf of his colleagues, staff and friends, **Mr. J. W. Townley,** C.B.E., M.I.E.E., presented him with a wrist-watch and a bureau bookcase. Tributes were also paid by **Mr. W. Spittle,** who succeeds to the post of superintendent, and by **Mr. H. J. Bennett,** chief generating engineer, London Division. We join his friends in wishing Mr. Bendix a long and happy retirement.

After more than 40 years' service with the British Thomson-Houston Co., Ltd., 15 of them as a director, **Mr. J. S. Ramsden,** M.I.E.E., has decided to relinquish his seat on the board of directors from Saturday next, September 30. He is, however, remaining with the company in a consultative capacity, and is retaining his seat on boards of the British Thomson-Houston Export Co., Ltd., Ferguson Pailin, Ltd., and the Switchgear Testing Co., Ltd. Mr. Ramsden obtained early technical education at Bolton and at Manchester School of Technology, after serving an apprenticeship as a textile engineer with Dobson and Barlow; he spent some while with the British Westinghouse Co. and Electric and Ordnance Accessories Co. before joining the B.T.H. drawing office staff in 1910. A year later he transferred to the Supply Department at Rugby, going to the Manchester district office as power salesman in 1913. He returned to Rugby as chief assistant to Mr. J. A. Phillips, manager of the Supply Department, and in 1919 became manager of the firm's Birmingham district office. In 1923 he again returned to Rugby as manager of the Supply (subsequently the Industrial Sales) Department. He was elected a director of the company in 1935, being appointed general sales director (plant and apparatus) in 1943. Mr. Ramsden has been a member of the B.E.A.M.A. Council, was vice-chairman in 1949-50, and has been chairman of the Dynamo and Motor Association since 1932.

Mr. J. S. Ramsden

Following the induction of the new president of the Association of Public Lighting Engineers, **Mr. P. Richbell,** M.Inst.Gas.E., as we recorded last week, it was announced at the annual meeting that the vice-president for the ensuing year would be **Mr. H. Pryce-Jones,** M.Eng.(Liv.), M.Inst.C.E.,

Mr. H. Pryce-Jones

Mr. J. F. Colquhoun

M.I.E.E., M.Inst.F. The other members of the council are **Mr. N. Boydell,** M.I.E.E., A.M.I.Mech.E., manager of the East Sussex and South West Kent Sub-area, South Eastern Electricity Board, **Mr. L. A. Doxey,** of Leeds, and **Mr. H. Carpenter,** A.M.I.E.E., illuminations and public street lighting officer to Blackpool Corporation. Mr. Pryce-Jones is, of course, manager of the Mid-Sussex Sub-area of the South Eastern Electricity Board. At the meeting last week, honorary membership of the Association was conferred upon **Mr. J. F. Colquhoun,** F.I.E.S., who retired from the position of city lighting engineer of Sheffield at the end of February last, after holding that post for 26 years. He was president of the Association in 1928-29.

Dry weather favoured contestants in the annual golf meeting of the G.E.C. Golfing Society held at Sonning Golf Club on September 16.

There were 54 competitors entered for the various events which were keenly contested. Prize-winners included **Mr. J. Gaskin,** of Lemington Glass Works, winner of "The Hugo Hirst Trophy"; **Mr. G. Plant,** of Pirelli-General Cable Works, Southampton, winner of "The Veterans' Cup"; **Mr. R. E. Robinson,** of the Telephone Works, Coventry, winner of "The Australia Cup for Senior Veterans"; **Mr. C. F. Boyes,** of Sales Department, Head Office, winner of "The Robinson-Rhodesia Tankard" for the best scratch score and **Mr. A. Jacob,** of Fraser and Chalmers, Erith, winner of the "Morning Medal Competition." Prizes were also gained by Messrs. **C. Boyes** and **A. T. Bridge,** and Messrs. **W. J. Bird** and **F. Sampson,** winners and runners up, respectively in the "Afternoon Four Ball Competition." At the conclusion of the day's play, prizes were presented by the **Hon. Mrs. Leslie Gamage.** During the evening **Mr. E. Silberman** took the chair at the annual dinner of the Society, and presented **Mr. Frank Farthing,** hon. secretary to the Society, with a box of golf balls in recognition of his services.

The Hon. Mrs. Leslie Gamage presents the Hugo Hirst trophy to Mr. J. Gaskin

Engineer Rear-Admiral D. J. Hoare, C.B., M.I.Mech.E., has accepted the invitation to become president of the Junior Institution of Engineers for the session 1950-51.

We learn from the Simplex Electric Co. Ltd. that **Mr. W. A. Cooper** is shortly to take up the position of South Wales area manager for the company. He has previously been employed by the Metropolitan-Vickers Electrical Co. Ltd. since 1936—apart from war service. Since 1946 he has been lighting engineer for M. V. for Wales and the West Country. A native of Mumbles, near Swansea, he is hon. secretary of the Cardiff centre of the Illuminating Engineering Society.

Mr. W. A. Cooper

Mr. J. S. Warren, of E.M.I. Sales and Services Ltd., has been elected chairman of the Domestic Electric Appliances Section of the B.E.A.M.A., in succession to the late Mr. F. G. Nesbitt. Until the latter's death, Mr. Warren was vice-chairman of the section. The new vice-chairman is **Mr. F. L. Humber,** of Ferranti Ltd.

Newman Industries Ltd. announce that **Mr. E. B. Piggott** has resigned from the position of secretary of the company for health reasons. **Mr. C. Bush** has been appointed to succeed him. Mr. Bush previously held an executive position with Wimpey Ltd. for a number of years.

On Thursday last, a specialist team on welding sailed in the R.M.S. *Caronia* for America for a six weeks tour, under the auspices of the Anglo-American Council of Productivity. The team, comprising 18 members, is the largest so far sent to the U.S.A. by the Council, and will be led by **Dr. H. G. Taylor,** D.Sc.(Eng.), F.Inst.P., M.I.E.E., director of research to the British Welding Research Association. Among its members are **Mr. S. H. Griffiths,** metallurgist and research engineer with John Thompson, Ltd., **Mr. J. A. Edwards,** welding foreman, Davey Paxman and Co., Ltd., **Mr. E. F. Newell,** secretary of welding sections, B.E.A., M.A., **Mr. H. E. Lardge,** chief metallurgist with Joseph Lucas, Ltd., **Mr. J. A. Dorrat,** welding engineer, Richardsons, Westgarth and Co., Ltd., **Mr. W. H. Rimmer,** welder at Clarence Dock power station, and **Mr. S. M. Reisser,** constructional engineer, Murex Welding Processes, Ltd. In America, the team is to study all aspects of welding equipment, materials handling, inspection, costs, working conditions, etc., and will return in the R.M.S. *Queen Elizabeth* on November 8.

On Friday last, **Mr. F. H. McCrea,** managing director of the Dubilier Condenser Co. (1925) Ltd., sailed in the R.M.S. *Queen Mary* for an extensive business tour of Canada and the United States.

Three new appointments are announced by the South Western Electricity Board. **Mr. L. S. Gould,** B.SC.(ENG.), A.M.I.E.E., is now distribution engineer in the chief engineer's department at the Bristol headquarters. He was previously with the London Electricity Board. **Mr. A. C. E. Bunker,** formerly a principal at the Board of Trade, has been nominated administrative officer, Cornwall Sub-area. The third appointment is that of **Mr. A. E. Mulvaney** as district commercial officer, Torbay. He was previously branch manager for the Board at Crediton.

Mr. L. S. Gould

Engineer of the No. 2 (Newbury) Sub-area of the Southern Electricity Board since vesting day, **Mr. W. D. Fisher,** M.I.E.E., retired recently after 46 years in the electricity supply industry. Educated at Church School, Swansea, and High School, Butte City (U.S.A.), he gained early training with Swansea Corporation Electricity Department, before going to Rochdale in 1907 as a meter tester. He later spent short periods with the Tynemouth, Barrow-in-Furness, Bury and Wigan undertakings, joining the Wessex Electricity Co. in 1928 as assistant engineer. In 1933 he was appointed chief engineer of the latter company, holding that position till vesting day.

Mr. John Oldham, O.B.E., J.P., chairman and joint managing director of Oldham and Son, Ltd., left for the U.S.A. last Thursday, in the R.M.S. *Caronia*, for important discussions with his firm's associates there. He expects to be away about two months. In addition to New York, his itinerary will include Boston, Philadelphia, Washington, D.C., Trenton, N.J., Buffalo, Chicago and North Carolina.

Mr. E. Holland-Martin has been elected to the board of British Aluminium Co. Ltd.

ELECTRIFICATION OF TRANSPORT

THE substantial increase in traffic receipts on the Liverpool Street-Shenfield railway following electrification of the route, is referred to in the second annual report of the British Transport Commission, issued last Thursday. The report covers the year to December 31 last, so the effects of the change are only partially reflected. But taking a typical week in December 1949, when complete electric service was in operation, the receipts amounted to £10,900, an increase of £2,700 (or 32·9%) over the corresponding week of 1948.

In regard to the Manchester-Sheffield-Wath electrification scheme, work is in progress on the manufacture of 85 locomotives, while electrical equipment, stored during the war, is being reconditioned. An outline of a scheme for the electrification of the London, Tilbury and Southend line has already been prepared, and a survey of the route for o.h. line equipment was carried out by British Insulated Callender's Construction Co., Ltd.

New Locos

Work is proceeding with the design of a 2,500 h.p. electric locomotive for main line service on the Southern Region, and also for a 1,250 h.p. mixed traffic locomotive fitted with auxiliary diesel power for shunting on non-electrified lines.

Two other 1,600 h.p. maritime diesel-electric locomotives for this Region are under construction, and designs for a third unit with a different wheel arrangement have been completed. It is noted that advantages of 350 h.p. diesel-electric locomotives for shunting duties are now established, and a specification is being prepared for a standard engine of this type.

Despite an increase of 2% in terms of car miles provided by London Transport trains, there was a decline of 2·4% in the total number of passengers carried during 1949, and a reduction of 1·8% in passenger traffic receipts. During the year authority was given to proceed with the extension of the Bakerloo line from Elephant and Castle to Camberwell Green—a distance of 1½ miles. Delivery of 143 new surface line cars, all fitted with motors and fluorescent lighting, should be completed this year.

A more unpalatable fact is that the operations of the Commission for 1949 resulted in a deficit of £20,761,233. Traffic receipts from London Transport trolleybuses for the year were £8,362,000—a reduction of £213,000, but working expenses were £139,000 up, at £7,717,000. Receipts from L.T. trams were £2,555,000 (£99,000 down), and for London Transport railways £14,823,000 (£262,000 less).

A total of 1,985·7 million units were used by the Commission. Of that total, some 779 million were used for traction alone by British Railways—an average of 2·58 units per car mile, while London Transport consumed 941·7 millions for similar purposes. The Commission's cost of generation and distribution of electricity for the year amounted to £9,276,516, with average cost of 1·121d. p.u., as against £8,659,851—1·119d. p.u. respectively in 1948.

The Commission had 2,184 miles of electrified track at the end of the year, of which 2,040 miles were of the d.c. low voltage conductor rail system, and 18 miles of a.c. high voltage o.h. conductor.

The BUYER'S *Column*

Standing-by for Winter

WITH the somewhat sudden approach of wintry weather, dealers are no doubt finding an appropriate increase of interest by their customers in the problems of space heating.

The "Spiraluxe" heater

One of the latest units produced by the SPIRAL TUBE AND COMPONENTS CO. LTD., Honeypot Lane, Stanmore, Middx., will enable dealers to solve, with complete satisfaction on the part of the customer, 75% of these problems.

This model is the Spiraluxe unit heater, a miniature heater which has all the advantages of the large-scale installations, yet is rated at 3 kW.

The motor-driven fan makes sure of proper air circulation, thus avoiding the occurrence of cold spots associated with some types of heaters. The heater can be provided with thermostatic control, maintaining a constant uniform heat in the room. An added point in favour of the unit is that in hot weather the fan may be used independently of the heater.

Price of the Spiraluxe portable model is £10 15s., plus purchase tax, whilst the unit fitted, in place of the foot, with a wall mounting bracket, sells at £11 10s., no purchase tax. It is for 200/220 or 230/250 V supplies, and stands 13 in. high.

Xcellent Recipes

THE new cookery book published by ELEXCEL LTD., of Victor Works, Broad Green, Liverpool 14, and issued free with each cooker sold by them, is more rightly an encyclopedia of the science of cooking.

Although it contains a wealth of information and recipes for preparing very many attractive dishes, the book also has much on the basic "bread-and-butter" recipes and on the fundamentals of selecting, cooking and serving food which, strangely enough, seem to be missing from the majority of so-called cookery books.

Another point in favour of this book is the substance of the pages and the strong paperboard covers. These are matters of some account when a book is for use in the kitchen.

Whilst it is intended primarily for those lucky users of "Xcel" cookers, the book is available to others at 3s. 6d.

New Osram Industrial Valves

TWO new "Osram" valves of interest to industrial users were announced recently by the General Electric Co., Ltd., Magnet House, Kingsway, W.C.2.

Type A.215f is a high vacuum half-wave rectifier with a directly heated oxide coated cathode. It is particularly interesting in view of its small physical dimensions (the overall length is only 5½ in.) and its ability to withstand a peak inverse voltage of 150 kV. This voltage rating is obtained when the valve is used in oil-immersed equipment. Output current is 1·0 mA maximum.

The valve has a low anode-to-filament capacitance (0·35 $\mu\mu$F) which makes it particularly suitable for use in high voltage rectifier circuits fed from a radio frequency source. The filament rating is 1·4 V 0·14 amp.

The second valve, Type A.1834, is an indirectly-heated double triode with an anode dissipation of 13 W, at 125 mA, for each triode unit. The valve has a very low anode resistance (280 ohms under working conditions) and is designed to operate at an anode voltage of 135 volts. Each section has a mutual conductance of 7·5 mA/V. The heater rating is 6·3 V 2.5 amps, and the valve is fitted with an international octal base.

A Magnetic Oxygen Recorder

AT the recent exhibition organised by the Scientific Instruments Manufacturers' Association, a great deal of interest was centred on the Magnetic Oxygen Analyser developed by the Distillers Co., Ltd.

A recent announcement by ELLIOTT BROTHERS (LONDON) LTD., Century Works, Lewisham, London S.E.13, is that arrangements have now been completed for the firm to manufacture this instrument. Production models will be fitted, however, with an Elliottronic potentiometer recorder.

The principle upon which this analyser is based was demonstrated by Michael Faraday almost one hundred years ago. In the present day instrument the principle of operation is as follows:

A quartz dumb-bell testpiece carrying a small mirror is attached by a suspension strip to an adjustable torsion head. The dumb-bell and mirror are mounted between shaped pole pieces of a strong permanent magnet in a cell designed to produce an effective sweep-out time of 8-12 seconds without disturbing the dumb-bell.

Movement of the dumb-bell is recorded by means of photo-electric equipment coupled to a d.c. valve amplifier which operates a standard chart recorder calibrated to read directly in % oxygen.

D

Price Reductions

IMPORTANT price reductions on certain of the motors produced by NEWMAN INDUSTRIES LTD., Yate, nr. Bristol, were announced recently.

The 15 h.p. motor was reduced in price from £51 3s. 2d. to £49 5s., the 20 h.p. model dropped from £63 18s. 11d. to £56 17s., whilst the price of the 25 h.p. machine is now £63 18s., a reduction in price of £8 11s. 6d.

Export prices are reduced correspondingly. It is stated that these reductions were brought about, despite the rising costs of materials, by the reorganisation of the company's works bringing in more efficient production methods.

TRADE PUBLICATIONS

LAMPS AND LIGHTING. A pocket edition of "Mazda" lighting equipment catalogue has just been issued by the British Thomson-Houston Co. Ltd., Crown House, Aldwych, W.C.2.

SPACE HEATING. This important subject in the broader sense of the words is covered very completely in a new booklet issued by Sloan Electrical Co. Ltd., 31-33 Bondway, Vauxhall, S.W.8. Details of the proprietary lines which Sloan's offer in their "off the shelf" service are included.

MOTORS. Anything by Higgs Motors Ltd., Witton, Birmingham, is important. Their abridged list just issued is also in this category. No one dealing with electric motors can afford to be without one.

ELECTRIC TRUCKS. Details of the Tomlinson "Stillager" which lifts and carries one ton in safety, and to us appears to solve all works transport problems, is described in a folder by the makers, Tomlinson (Electric Vehicles) Ltd., of Cheltenham Road, Witney, Oxon.

RECORDING INSTRUMENTS. The type 1406 high-speed level recorder is described in a leaflet issued by Dawe Instruments Ltd., 130 Uxbridge Road, Hanwell, London W.7. This recorder was primarily developed for making acoustical measurements but is suitable for any application requiring a permanent continuous record of any rapidly changing electrical signal over a wide range of intensity.

B.C.E. Private Exhibition

On Friday last, the British Central Electrical Co. Ltd. held a small private exhibition at the Savoy Hotel staged with the object of affording some of their customers an opportunity of seeing recent products and ideas. Five other manufacturers, Barlow Whitney Ltd., Channel Conduits (1949) Ltd., Electric Construction Co. Ltd., Wm. Sanders and Co. (Wednesbury) Ltd. and Wolf Electric Tools Ltd., for whom B.C.E. are either agents or main distributors, collaborated in the exhibition.

General view of part of the exhibition

As might be expected, space did not permit most manufacturers to display more than a token exhibit of their less bulky lines. Barlow Whitney Ltd., for example, showed a representative collection of smaller products such as glue pots, metal and solder pots, a small oven and one or two industrial heavy-duty hotplates. The Electric Construction Co. Ltd. showed "Varispeed" units with metal and glass bulb rectifiers.

Wm. Sanders showed a token range of metal-clad switches and fuses, with a 400 amp t.p. unit of exceedingly robust construction, with adequate space for cabling, and their industrial connector set, a 30 amp d.p. switch and fuse with a die-cast connector plug for 2-pin and earth connection, interlocked with the operating mechanism, and examples of their unbreakable plug tops. Channel Conduits Ltd. and Wolf Electric Tools Ltd. displayed a number of their standard lines.

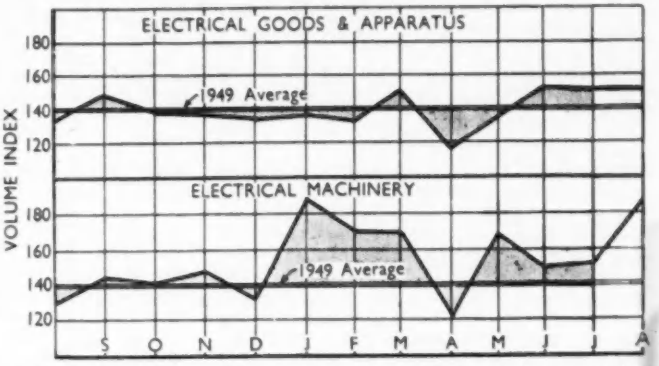
One of the most interesting small items on the B.C.E.'s own stand was a new design of wiremen's pliers having a double head (round and flat nose) and handles pivoted so that either head was instantly available. Other exhibits included their portable full-load earth continuity tester, "Kopex" flexible conduit, B.I.C.C. power factor correction capacitors, the Horstmann "H.B.E." synchronous timing unit and a number of other items including a full range of their well-known "Gripper" handlamps.

EXPORTS AND IMPORTS

EXPORT VOLUME INDEX

Trade returns for August show that £7,443,661 was the value of electrical goods and apparatus exported during the month, while for electrical machinery the corresponding figure was £4,568,784. Adjusted for price changes since 1947, these values are equivalent to 153% and 185% respectively of the average export rates achieved during that year.

Export targets are no longer issued by the Board of Trade, and so comparison is made with the average rate of exports during 1949.



EXPORTS of all types of electrical goods last month reached the record total of £12,453,574, being some £596,795 in value more than the previous highest figure reached in March last. Increased exports were recorded for most of the items, the greatest rises being for wireless apparatus and for the heavier equipment. Of the former, exports of transmitters were chiefly responsible for the rise. In the machinery group it is worthy of note that of the generators up to 200 kW, totalling £1,229,695 in value, which were exported last month, Soviet Russia took £876,850. Electric flat irons sent abroad last month amounted to £43,081—over £4,000 less than in July. In the convertors, transformers, rectifiers group, switchgear and switchboards alone were responsible for £843,199 of the total last month, while transformers amounted to £684,029.

As far as electrical equipment was concerned, Australia was our principal customer last month, taking goods to a total value of £1,505,669. The corresponding figure for South Africa was £1,220,502, for India £1,123,418, for New Zealand £419,983, and for Canada £359,611.

Description	Exports Value Month of August			Imports Value Month of August		
	1948 £	1949 £	1950 £	1948 £	1949 £	1950 £
Telegraph and Telephone Wires and Cables						
Submarine	411	39,336	473,588			
Other	706,411	787,969	715,234			
Rubber Insulated	364,680	357,993	349,552	14,963	24,186	27,808
Insulated, other than Rubber	806,522	1,017,313	603,106			
Wireless Apparatus, including Valves	830,993	903,796	1,747,555	56,463	92,477	202,369
Telephone and Telegraph Apparatus	1,145,680	1,338,972	1,300,524	4,421	10,082	5,976
Electric Lighting Appliances, Accessories, Fittings and Parts—						
Bulbs and Discharge Lamps	116,000	121,757	147,541	7,039	7,467	19,968
Other Descriptions	388,899	334,759	290,880	3,259	5,068	17,233
Batteries (primary)	52,292	82,730	117,391	—	—	—
Accumulators, Portable	145,937	195,096	191,403	—	—	—
,, Stationary	33,652	36,525	103,502	—	—	—
,, Parts and Accessories	61,633	84,629	68,680	—	—	—
Electrical Cooking and Heating Appliances	235,572	184,810	269,271	—	—	—
Ammeters, Voltmeters, etc., and Parts	75,424	98,624	107,671			
House Service Meters	207,158	116,088	111,280	12,838	19,719	24,181
All Other Instruments	94,952	91,693	115,964			
Electro-Medical Apparatus	24,427	39,633	44,131	—	—	—
X-Ray Apparatus, etc.	39,683	94,597	53,431	25,207	19,533	13,343
Insulating Materials	130,111	114,527	126,892	—	—	—
All Other Articles	400,035	377,836	506,165	65,669	87,714	86,741
TOTAL OF GROUP	5,870,622	6,547,973	7,443,661	189,865	286,246	398,619
Electrical Machinery—						
Generators (not exceeding 200 kW)	223,100	483,367	1,229,695			
,, (exceeding 200 kW)	98,102	367,761	552,076	7,314	21,768	11,628
Parts	98,184	98,421	245,312			
Motors	569,015	643,894	716,359	28,724	27,006	46,332
Convertors, Transformers, Rectifiers, Motor Control Gear, Switchgear, other machinery	984,564	1,545,652	1,825,342	6,488	21,090	13,517
Fans, Electrically and Power Driven	106,230	101,365	147,503	—	—	—
Vacuum Cleaners or Electrically Operated Appliances	147,114	260,496	293,626	3,971	8,383	5,656
TOTAL APPLIANCES AND MACHINERY	8,096,931	10,048,929	12,453,574	236,362	364,493	475,752

THE WEEK

INDUSTRY *in news* COMMERCE

Festival Sound Reproduction

SOUND reproduction installation in the Royal Festival Hall at the Festival of Britain will be designed and produced by Standard Telephones and Cables Ltd. Some details of the installation, which will comprise three main and two intercommunicating systems, have been released this week.

The system in the Concert Hall will have two amplifying channels each connected to a six-channel microphone mixer and the outputs coupled to a duplicate bank of three loudspeakers. A portion of the output of the equipment will feed a second system, the amplifier of which will provide for deaf aid outlets in the seats. The third is a central internal broadcasting network which will be used for announcements to the foyers, vestibules and promenades. Inter-communication systems will be of the loudspeaking telephone equipment type, and will be installed in the hall and restaurants.

Gas Strike's Good Turn

LABOUR troubles in the gas industry in London has at least been beneficial to some electrical firms. A well-known catering organisation which experienced difficulties in maintaining supplies of boiling water because of reduced gas pressure is one illustration. It decided to use electric washboilers and Simplex Electric were asked to install their Creda C.80 washboilers at many of the teashops. This may be cited as an occasion when one good turn does not deserve another.

Imports from Western Germany

THIS week, the various "liberalisation" import concessions now applying to many European countries, were extended to Western Germany, in accordance with Britain's obligations under the Organisation for European Economic Co-operation, and following the signature of the E.P.U. agreement. These concessions permit the import without individual licence of a wide range of goods from most O.E.E.C. and many other soft-currency countries. The list of electrical goods covered includes generators, motors, rectifiers, transformers, switchgear, accumulators, electric blankets and pads, coffee percolators, fans, floor polishers, irons, kettles, washing machines, shavers, toasters, vacuum cleaners, batteries, torches and handlamps, lighting fittings, fluorescent and discharge lamps, radio equipment, hairdryers, refrigerators, watthand meters and telephone apparatus. It will be recalled that Mr. L. G. Hawkins drew attention to this new agreement in our August 31 issue.

Export Lectures

"THE WORLD TODAY" is the title of a series of lunchtime lectures for members of the Institute of Export which will begin next week. The lectures will be held weekly at Conway Hall in Red Lion Square and fifteen countries will be covered by a prominent official of the country under discussion. The first lecture will be on October 3 when the Commercial Secretary to the High Commissioner for Canada, Mr. R. P. Bower, will be the speaker. We note that non-members may attend the meetings and tickets for the whole series will cost 5s. 6d.

Supply to St. Michael's Mount

THE castle on the picturesque St. Michael's Mount, in Cornwall, and the village at the foot of the Mount are soon to be provided with mains electricity supplies to replace those from the private generating plant on the island.

The laying of the 11 kV cable proved an interesting operation, involving a continuous race against the tides. The 830 yards length of three-core armoured cable was mounted on rollers and towed across at low water by tractors working part of the time in surf. The cable was afterwards buried in a one-foot deep furrow. Work throughout was carried out by Pirelli-General Cable Works Ltd. The supply will be catered for by two 125 kVA transformers, the probable maximum demand being 100-150 kVA.

Giant's Causeway—Another Proposal

AT the meeting of various parties interested in continuing the operation of the Giant's Causeway Tramway, Northern Ireland, to which we referred on September 7, it was decided to request the Ministry of Commerce to purchase the undertaking for Ulster Transport Authority.

The First Half-Century

A criticised extract from a leaflet "How to Reduce Electric Light Bills.": "After a short period in use the vacuum is gradually lessened, a smoky deposit forms inside the glass; failure in power and waste of energy results. The cause of this waste has been invariably traced to an imperfect or faulty contact in the lampholder. This can be remedied by users themselves at a trifling cost." The leaflet then referred to a patent stylo "which cost 2s. and worth £2 to electricity consumers."—*From our issue of September* 27, 1900.

Shoppers act as Guinea-pigs

BIRMINGHAM shoppers have unconsciously been acting as guinea-pigs in an experiment to gauge the pulling power of two new Creda cooker displays. The experiment has been organised by the advertisement department of Simplex Electric Co., Ltd., and the displays have been situated 50 yds apart at the Midland Electricity Board Service Centre in Paradise Street and the company's showrooms in Easy Row. Observers have been watching the reactions of the public to both displays and will decide whether one or other of the displays will be ordered in quantity.

The display at the M.E.B. Service Centre consists of full-size cut-out figures of a mother and child and a large display unit with mounted photographs illustrating various features of the cooker. Written copy is kept down to a minimum. In their own showrooms the display consists of a triple screen, triple coloured background with name-board and caption panels giving the main features of the cooker.

Electrical Films

AS part of their policy of bringing developments abroad to the notice of electrical engineers in this country, Enfield Cables held a private film show last Friday at the Astoria Cinema. Several films of general electrical interest were shown. One, a propaganda film, showed the hydro-electric developments in Switzerland. An excellent instructional film produced by General Electric of America explained the basic principles of electricity. From Sweden came a record of the work being done in the erection of long-distance transmission line, and a Canadian film showed the building of Shipshaw hydro-electric station.

Far East on Show

THE Far East is shortly to show the world that she can hold her own in international markets. Her products, industrial achievements and natural resources are to be exhibited at the International Exposition to be held at Bangkok from December 5 to March 31, 1951. There will be ten major halls housing exhibits in 15 categories besides sites available to exhibitors who want to erect their own pavilions. This is believed to be a unique instance when manufacturers all over the world will be able to see Far Eastern commerce and industry as well as show their own.

Space is provided in a Communications and Electronics building for 66 exhibits of electrical apparatus, radios, televisions and electronic equipment. In another hall, light fittings and ventilating equipment and other household electrical appliances will be classified under building materials and household furnishings.

Paper Model helps Pit Lighting

A REALISTIC half-scale model of a coal-mine roadway has been completed by G.E.C. Research Laboratories at Wembley to investigate methods of lighting in the mines which will facilitate safe and easy movement for the men working there. The model tunnel, made of brown paper, is 3 ft 6 in. high, 7 ft wide and 30 ft long, although a mirror at the far end gives the effect of looking down about 120 ft of full-size roadway. Tinsel strip is used in place of the rails and an old pram body similates a coal tub.

This ingenious and realistic brown paper model will prove invaluable in the study of lighting problems affecting some 10,000 miles of underground roadways. Methods of avoiding glare and of grading lighting to help miners adapt themselves to daylight while travelling from the pit to the coalface can be tested in the laboratories.

"Towards Perfection"

PERFECTION in design and performance of domestic electrical apparatus is the aim of the latest E.A.W. survey launched last week. It is the ninth survey undertaken by the Association in its 25 years and once again Mrs. E. E. Edwards, area organiser for S.E. England, is in charge. It follows two major enquiries conducted in the early 1930s and during the war which asked for housewives' views on domestic electrical equipment.

The questionnaire takes the form of an 18-page booklet and deals with every appliance from cookers and refrigerators to irons and kettles. So

Creda cooker experimental displays in Birmingham. Left: at the Company's showrooms, and (right) at the Midland Electricity Board's showrooms

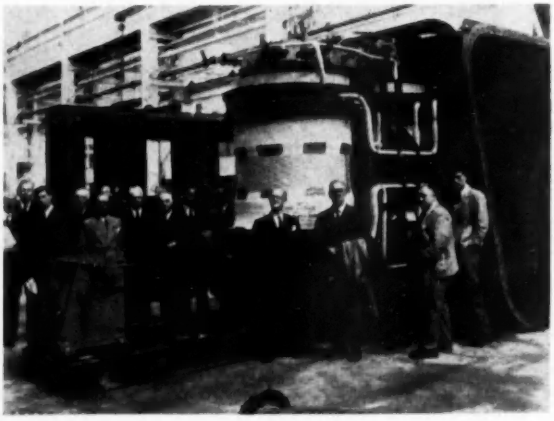
as to include everything, a final page deals with miscellaneous appliances such as hair dryers and toasters. The booklet has been circulated to every branch of the Association and other women's organisations but the only qualification needed to fill in the questionnaire is personal experience of an appliance. The questions are very comprehensive. Concerning cookers, owners are asked their preference for colour, the height, the number and placing of boiling plates and size of oven. On irons they are asked for the length of flex, shape of handle and whether they consider thermostatic control a necessity or merely a convenience.

We note that men are by no means debarred from making their views known, although space has not been left in the questionnaire for comments on what they are more usually interested in, the price of the appliance. Closing date of the survey, which will go on throughout the autumn and winter, has not been announced, but it will probably be in March. The completed survey will be circulated through the trade and, it is hoped, it will provide data to influence the design of future appliances.

Trams give way to Buses

FROM two cities comes news this week of plans to replace trams by motor buses. Most immediate replacement is in London where five new bus routes take over five tram and one short trolleybus route on Saturday and Sunday. This is the first stage of the scheme to convert all South London's tram routes to bus operation, and the services affected will be in Battersea, Chelsea, Camberwell, Finsbury, Holborn, Lambeth, Southwark, Wandsworth and Westminster. L.T.E. state that although every effort has been made not to alter routes, it is probable that a complete review will be necessary to counteract changes in the public's travel habits.

I.E.E. Supply Section Members examine novel s.p. unit for 45 MVA 210/120/22·5 kV bank for Australia during their visit to B.T.H. Rugby *(see page 493)*



In Edinburgh next week the town council will have before them a recommendation that 25% of the trams should be replaced within the next five years. The city's Civic Amenities Committee has rejected by one vote an amendment that trolleybuses should be considered as an alternative to buses in the replacement.

Exports to Canada

FOLLOWING the recent shipment of a 15,000 kVA bank of capacitors for the Shawinigan Water and Power Co. of Quebec, British Insulated Callender's Cables Ltd. have received a further order for a 20,000 kVA bank of capacitors. They are for operation at 10·3 kV and have been ordered by the Aluminium Co. of Canada for installation on another section of the Shawinigan system. About one-half of the order will be despatched by the end of this month and the remainder will follow at intervals until November. An early delivery date was stipulated so that an increase in aluminium production during the winter load period will not cause an excessive voltage drop on the transmission network which comprises some very long lines.

British Silicone Manufacture

AS announced in our issue of August 10, Albright and Wilson, distributors in Great Britain of the silicone products of the Dow Corning Corporation of America, are to make silicones in this country.

To provide for the organisation required to sell these specialised products a new company, Midland Silicones, has been formed. It will be owned jointly by Dow Corning Ltd., a British subsidiary of the Corporation, and by Albright and Wilson Ltd. Arrangements are under way for the issue of shares.

Carpet Dyeing "in Situ"

TO BE demonstrated to the trade for the first time at the Laundry Exhibition at Olympia, which opens today, is a new carpet dyeing machine. Made by R. G. Dixon and Co., Ltd., Capital Works, Empire Way, Wembley, this machine is a portable appliance which brushes the dye into the pile of the carpet, thus the dye does not reach the back and shrinkage does not occur.

The dye is kept in a container mounted on the shaft of the machine and is fed through flexible pipes to the rotating brush, the rate of feed being controlled by the operator. Thermostatic control, applied to a heating element, keeps the dye just below boiling point and thus "fast" dyes can be applied.

Dealers' Window Displays

THE Mazda dancing girl will again be prominent in the B.T.H. lamp and

Left: Siemens showcard tie-up with London bus posters. Right: David Langdon's drawing for B.T.H. showcard and window displays for Mazda lamps

lighting equipment advertising campaign this winter, details of which are to hand this week. Three complete window displays are available to dealers, the centrepiece of each being a coloured showcard of a David Langdon drawing with the slogan "What lamps stay bright?" This will also be obtainable as a separate unit. A counter showcard featuring the dancing girl has a projecting curved band at the bottom forming a compartment in which lamps may be displayed.

Mazda paper pelmets, which reached dealers for the first time early this year, continue as an additional item for window displays, and can of course still be used individually. New, among the dealers' selling aids this winter, will be a window transfer to show that the particular dealer stocks Mazda equipment. These aids will link up with Press and outdoor advertising and the illuminated box signs and painted advertisements for dealers' premises will also be retained. Some of the hoardings on main roads will be floodlit and B.T.H. policy of displays at many important exhibitions will be continued.

For windows which lack backgrounds, Siemens are supplying dealers with a self-contained display piece for lamps which when opened out is 5 ft 6 in. high and up to 12 ft 6 in. in width. The slogan "Natural charm enhanced by Siemens lamps" links up with the central photograph. Of particular interest is the showcard which features the piercing eyes of a cat and a very appropriate slogan "All the better to see with." The same design also provides a poster for each side of the destination board on London buses. The tie-up is admirable. The season's slogan for Siemens batteries will be "have that extra punch" linking up with the main feature of the showcard, a boxing ring with a bout in progress.

Courses in Weldings

THE regular courses of instruction in welding techniques, which are in preparation for the winter months by the Quasi Arc Co., will this year have some vacancies.

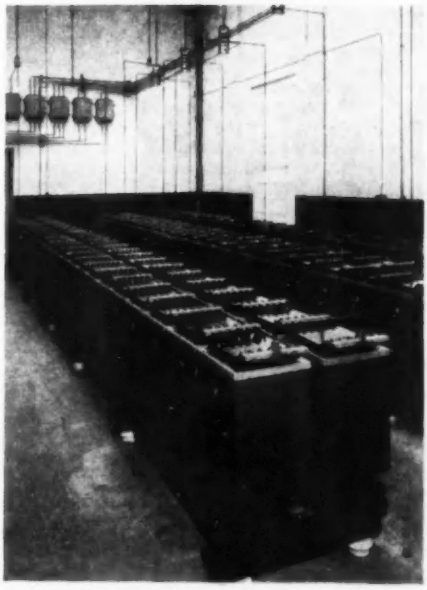
The company has two schools, one at Bilston, Staffs, and the other at Cricklewood, London. Both are well equipped with modern plant but students at Bilston have the added advantage of lectures from the design and research staffs of the firm and instruction in radiographic examination of welds being included in their courses.

Special courses for groups requiring instruction in specific subjects can also be arranged. Details of these courses are contained in a circular No. 791 obtainable from the company either at Bilston or from their London office.

Automatic Battery Control

IN order to maintain correct battery voltage for auxiliary services at Croydon "B" station an unusual automatic switching equipment has been installed. Made by the Tudor Battery Co., this equipment enables extra cells to be switched in as required. Normally 105 cells are connected to the busbars and are kept floating across a mercury-arc rectifier, the remaining 19 cells of the 124-unit battery being charged by a selenium metal rectifier. In the event of a mains failure a battery governor and automatic solenoid-operated discharge regulating switch come into operation and maintain the battery voltage, under continuous discharge conditions at 240 V by switching in successively the extra cells. When the last cell has been switched in, indication is given to the control room.

The 124-cell Tudor battery installed at Croydon 'B' power station



NEWS IN BRIEF

The Electric Cables and Wires Panel of Engineering Standards Co-ordinating Committee (M.o.S.) has issued an amendment to GDES 22 for equipment wire. It concerns the substitution of climatic tests in place of the exhaust steam test, and is on sale at H.M. Stationery Office, price 1d.

"Electricity Supply Statutes," giving up-to-date statutes, is available from Mr. J. W. Simpson, 16 Stratford Place, London W.1, at 15s. a copy, plus postage.

An order for a 100 tons per hr capacity heavy-media separation plant for treating manganese ore in West Africa has been received by the Fraser and Chalmers Engineering Works of G.E.C. Ltd.

The Igranic Electric Co., Ltd. are repeating their "Open Day" of September 1949, when they entertained over 5,000 visitors, with a similar event on October 7. The programme includes a two-hour tour of the works.

Ten per cent. of the sweepstake at the Crompton and Parkinson Ltd. golf meeting held near Chelmsford last Friday was given to the E.I.B.A. The sum amounted to £8 7s. 9d.

The Tunbridge Wells branch of Electrical Contractors' Association visited Ford Motor Works at Dagenham last week. The outing was continued in London in the evening when the party saw *Latin Quarter* at the Casino.

In the reference to the laying of the Dutch-Danish telephone cable in the September 21 issue, the distance was wrongly stated to be 250 miles. The length of each of the two cables laid is 142 nautical miles.

Questions in Parliament

P.T. on Water Heaters

When Mr. Redmayne asked the Chancellor of the Exchequer to state the present reason for taxing gas and electric water heaters, and if he would remove the anomaly, Mr. Jay replied that immersion heaters and electric instantaneous water heaters were charged at a higher rate than electric storage water heaters and gas water heaters because of the need to relieve the strain upon the peak load of the electricity supply industry. He intimated that he would continue to consult the Minister of Fuel and Power on the subject.

Retirement Age

Mr. Wingfield Digby asked the Prime Minister whether, in view of the need to conserve man power to meet the requirements of the rearmament programme, he would instruct departments to discontinue the policy of automatically retiring employees on reaching 65 years of age; and if he would also seek the cooperation of the nationalised industries in the matter. Replying, Mr. Attlee said there were standing instructions to continue to employ such persons if they were so willing, and he had no doubt that the nationalised industries were aware of the position.

Copper Price

When the question of the price of copper was raised, J. Grimston asked the Minister of Supply what proposals he had to compensate exporters of heavy electrical equipment, who needed to cover their requirements many months ahead, for having to pay the premium on the forward purchases of copper, which he had imposed in order to prevent speculation? He referred to the premium as a fine on forward purchase of the metal, and as a serious burden on productive industry, on which the export trade depended.

Mr. Strauss replied that the matter was under discussion with the industry to see whether an alternative method could be found which would be more acceptable to the trade, while providing the necessary protection to the Exchequer.

Electric Supply News

Bristol

The Corporation Housing Committee has agreed to install additional points for electric cookers and water heaters in houses on the Manor Farm Estate at Horfield, thus ending the controversy that has existed between the Committee and the South-Western Electricity Board. (The Board had asked for more points or a contribution towards the capital cost of the mains work.) The Committee has also agreed to put additional points in 22 houses at Penpole and Shirehampton.

Douglas (I.O.M.)

At this month's meeting of the Corporation it was reported that the bulk supply to the Isle of Man Electricity Board ceased completely on August 9. The borough electrical engineer is communicating with the Corporation consulting engineers, Kennedy and Donkin, with a view to claiming compensation, the Council also agreed to a proposal of the Electricity Committee to open a showroom on the ground floor of the Savoy Café in Victoria Street, with the object of attracting more customers for current, but referred back a recommendation providing for the establishment of a post of showroom supervisor at £400 a year, plus £50 cost of living bonus.

It was suggested that it was time for the committee to consolidate their position and give care-

ful consideration to the future before entering into further expenditure. One member suggested that two canvassers could get more customers than the proposed showroom.

Malvern

A revised proposal for a power line on wooden pylons on an alternative route across the Malvern Hills, after the refusal of the Minister of Fuel and Power to consent to the original proposal, is likely to meet with equally strong local opposition, we understand. Local councils and public bodies who opposed the original scheme anticipate that a second public inquiry will be held. It is understood that the revised scheme is for the line to run across hills south of the original proposal.

Orkney

Work on the power station building at Kirkwall is progressing well, and it is hoped that a start will be made on erecting the machinery next month. The two 1,000 kW diesel sets are already on site. Meanwhile the consumers' system in the area is being changed from d.c. to a.c.—in Kirkwall some 40% of the conversion work has been completed.

Progress is also reported from Costa Head, which is to be the site of the first experimental windmill set in Gt. Britain. A tower and a research work mast have been erected and the generator was due to arrive this month. It is to be hoped that by October Orkney's winds will be utilised to drive the windmill generator.

LIGHTING SCHEMES

Colne Valley (Yorks).—The U.D.C. has adopted a long-term £40,000 scheme for the conversion of street lighting to electricity. On the first stage not more than £10,000 is to be spent.

Newcastle-upon-Tyne.—The T.C. is considering converting 51 gas lamps in Grey Street and Higham Place, at a cost of £1,530.

Newton Abbot.—The new £7,000 street lighting scheme was partially completed in time for the town's Shopping Week recently.

Nottingham.—A scheme for improved lighting of all traffic routes and residential roads, has been approved. It includes the conversion of all gas lamps to electricity, the work being spread over about 10 to 15 years.

Plymouth.—The Lighting Committee has approved the experimental installation on part of Mutley Plain, of a fluorescent lighting.

Southport.—Improved lighting for Norwood Road is likely if a Corporation proposal is accepted for an experimental installation of nine lamps mounted on trees about 13 ft from the ground.

St. Helens.—New lighting for trolley-bus routes at a cost of £12,000 has been approved by M.o.T.

Company Activities

Albright and Wilson

Approval has been given to the increase in authorised capital from £4,000,000 to £5,500,000, including the creation of 2,084,604 5% £1 cumulative Preference shares. Letters of rights were sent out last week in respect of the issue of 2,023,164 of the 5% Preference shares at par in the ratio of one for every two 5s. units held.

Ferranti Ltd.

In the preliminary statement an Ordinary dividend of 6% less tax on the £500,000 capital, is announced. For the previous year, the dividend was 6% tax free on £300,000 capital. Group profit, after all charges, including £297,000 (*£206,000*) for taxation, was £248,100 (*£133,027*), all attributable to the holding company. The profit figure takes into account a net loss of £14,481 (*£45,791*) incurred by subsidiary companies. To general reserve £200,000 (*£139,931*).

John Shaw and Sons (Wolverhampton) Ltd.

Consolidated trading profit, etc., for the nine months to March 31 last was £142,545 (*£155,924 for previous 12 months*), plus Govt. securities income £308 (*same*), interest on tax reserve certificates £136 (*£792*), surplus bad debts reserve £217 (*£431*), making £143,206 (*£157,455*). To depreciation £18,609 (*£23,009*), pensions and life assurance benefits £12,020 (*nil*), deferred repairs £36 (*£402*), profits tax £16,200 (*£16,900*), income tax £41,471 (*£55,613*), profits of a subsidiary attributable to outside shareholders £308 (*£616*), undistributed profits of subsidiaries attributable to company £1,591 (*£2,171*), leaving parent company's net profit £52,971 (*£58,744*).

Superheater Co.

The directors propose that the amount of 5½% Redeemable Cumulative Preference stock in issue should be stabilised at £220,000. It is proposed that £27,827 should be drawn for redemption on December 30. An extraordinary meeting is to be held on October 12.

Dividends Declared

A. C. Cossor. Consideration of a payment in respect of the 6% Preference dividends accruing to September 30 next has been postponed until the results of the current year's trading are known. Dividends have been paid up to March 31, 1948.

Engineering Components. Interim dividend of 10% (*same*), payable on October 4.

W. T. Henley's Telegraph Works Co. Ltd. Interim dividend of 5% (*same*), payable on November 17.

Marconi International Marine Co. Interim dividend of 2½% (*same*).

Superheater Co., Interim dividend of 15% (*20%*) on enlarged capital.

Commercial Information

CONTRACTS OPEN

HOME

Sept. 29.—Clare(Suffolk)R.D.C. Wiring of 10 houses at Kedington. Surveyor, Stonehall, Clare, Sudbury.

Sept. 29.—Dublin T.C. 100 "swan neck" lighting brackets and 200 modern type brackets with control gear boxes. City Engineer's Office, 28 Castle St.

Sept. 30. — Maidstone T.C. Wiring and replacement of electrical fittings in 26 houses. Borough Surveyor, Palace Ave., Maidstone.

Sept. 30.—Lowestoft T.C. Electrical installation at 42 houses on No. 2 site at South Lowestoft. Borough Engineer's Dept., Town Hall, Lowestoft. Deposit £1 1s.

Oct. 2.—Exeter T.C. Manufacture and erection of an electrically driven sludge pump of 10,000 gall per hour capacity at Countess Wear Sewage Works. City Engineer and Surveyor, 7 Southernhay West, Exeter.

Oct. 4.—Hawick T.C. Electrical installation to 3 houses at Commercial Rd. Burgh Surveyor, Municipal Bldgs., Hawick.

Oct. 4.— Manchester. Wire and cable for street lighting and lanterns during 1951. City Surveyor's Dept., Town Hall, Manchester 2.

Oct. 4.—West Lothian C.C. Electrical work to 30 houses at Longridge. John Calder, Deputy County Clerk, County Bldgs., Linlithgow.

Oct 5.—Belfast T.C. Additions to electrical installation at Park Parade Intermediate School. Education Architect's Office, Academy St.

Oct. 6.—Belfast. Refrigerator, 15 cu ft or new plant for existing refrigerator for Belfast City Hospital. Supplies Officer, S. Belfast Hospital Management Committee, Lisburn Road.

Oct. 6.—Sheffield T.C. Electrical installations to 630 houses and 48 old persons' dwellings on Stradbroke estate and 44 old persons' dwellings on Manor Park estate. W. George Davies, City Architect, Town Hall, Sheffield 1. Deposit £1.

Oct. 6.—Sheffield T.C. Electrical installation at Herries Rd. bus garage. W. George Davies, City Architect, Town Hall, Sheffield 1. Deposit £2 2s.

Oct. 7.—Lancashire C.C. Electrical installation at 10 houses at Huyton. County Architect, County Offices, Preston. Deposit £2.

Oct 7.—Stepney. Installation of electric lighting, heating and power at 145 flats and houses in Bancroft Rd. A. A. Hudson, Borough Engineer and Surveyor, Municipal Offices, Duval St., E.1. Deposit £5. (See Sept. 14 issue).

Oct. 9.—Dalkeith. Electrical work in 36 houses. Morham and Brotchie, Surveyors, 29 Hanover St., Edinburgh.

Oct. 9.—Dunbar T.C. Electrical work on 16 houses at Summerfield. S. W. Brown, Town Clerk, Town House, Dunbar.

Oct. 9.—Fylde (Lancs). Erection of 2 small electrically driven pumps for Water Board. H. Will Apted, Engineer to the Board.

Oct. 10.—Bristol T.C. Electrical work at the Crescent, Downend, and Downend Babies' Home. City Estates Surveyor and Valuer, The Exchange, Corn St., Bristol 1. Deposit £2 2s.

Oct. 10.—Galway. Electrical installations at Western Regional Sanatorium, Merlin Park. 4,650 medium voltage outlets for lighting, heating, cooking, etc., and 1,320 low voltage outlets for call systems, radio, clocks, etc. Secretary, Dept. of Health, Custom House, Dublin. Deposit £20.

Oct. 10.—Tamworth T.C. Wiring in welded screwed tube of part of Tamworth Castle. H. F. Bruce Smith, Borough Engineer and Surveyor, Municipal Offices.

Oct. 10.—Wortley R.D.C. Supply and erection of 50 standards and installation of street lighting at Grenoside. Engineer and Surveyor, Council Offices, Grenoside, Sheffield. Deposit £2 2s.

Oct. 11.—Bournemouth T.C. Supply and erection of vehicle-actuated traffic signs at Ashley Rd. Borough Engineer, Town Hall. Deposit £1 1s.

Oct. 12.—Blackpool T.C. Installation of electric lighting, heating, power, bells, etc., at Grange Park county primary school. Borough Surveyor, Municipal Bldgs. Deposit £2.

Oct 13.—Belfast. Water screening plant of vertical rotating band type to deal with 2,880,000 gall/hr, for Harbour power station. Merz and McLellan, consulting engineers, Carliol House, Newcastle-upon-Tyne 1. Deposit £5 5s. (See Sept. 14 issue.)

Oct. 13.—Sheffield T.C. Electrical installation to 16 police houses. Deposit £1. Also electrical installation at Acres Hill county primary school, for E.C. Deposit £2 2s. Separate tenders. W. George Davies, City Architect, Town Hall, Sheffield 1.

Oct. 14 . —Ceiriog (Denbigh) R.D.C. Re-wiring of electric light and power points in 25 houses, Glyn Ceiriog. R. W. Aubrey, Surveyor, The Mount, Chirk. Deposit £1 1s.

Oct. 16.—Lisburn U.D.C. Supply of two 12½ h.p. electric motors with starters, vee belt drives, switchgear, and electrical installation at the waterworks, Pond Park. T. H. McDonald, Town Clerk, Town Hall. Deposit £2 2s.

Oct. 16.—Swansea T.C. Electrical installation at Penlan primary school. Borough Architect, The Guildhall, Swansea. Deposit £2. (Advertised in this issue.)

Oct. 18.—Metropolitan Water Board. Two sets of electrically driven well and surface pumps for Chingford Mill pumping station, Hall Lane, Chingford. Chief Engineer's Department (Room 235), Offices of the Board, New River Head, Rosebery Av., E.C.1. Deposit £1 1s.

Oct. 20.—Carlisle. Six vertical spindle motor-driven pumps and accessories, capacity 38 million gall per day. L. J. A. Stow, City Engineer and Surveyor, City Engineer's Office, Carlisle.

Oct. 28.—Sutherland T.C. Electrical work to a block of 2 houses and 2 garages. E. W. Brannen, Carnegie Buildings, Dornoch.

Oct. 30.—Manchester. Electrical installation at Newall Green infants' school, Wythenshawe. City Architect, Town Hall. Deposit £1 1s. (Advertised in this issue.)

No date stated.—Castle Ward (Northumberland). Conversion of 94 houses from gas to electric lighting at Hazlerigg. G. E. Dimmack, Surveyor, 7 North Rd., Ponteland.

No date stated.—Carlisle T.C. Electrical installation in 128 houses. City Engineer, 18 Fisher Street.

No date stated.—Aberdeen. Heating and electrical engineer works in reconstruction of classrooms and laboratories at Aberdeen Grammar school. J. A. O. Allan, Ross and Allan, Architects, 10 Bon-Accord Sq.

No date stated.—Fife C.C. Electrical work in 26 houses at Kinglassie. Also electrical and heating work at infants' school at Oakley. James Gentles and Son, Chartered Quantity Surveyors, Central Chambers, Kirkcaldy.

No date stated.—Haddington. Installation of electricity in 250 houses at present lit by gas. Burgh Surveyor, 55 High St.

No date stated.—Kilrenny T.C. Electrical works in erection of 26 houses at Glebe site, Anstruther Weston. A. D. Haxton and Watson, Architects, Leven.

OVERSEAS

*Details of items marked * may be obtained on application to Room 1076, Board of Trade, Thames House, North Millbank, S.W.1, quoting reference.*

Oct. 10.—Mozambique. Two diesel generators each of 150 kW 380-220 V. Permanent Purchasing Commission, Mozambique Treasury Dept., Laurenco Marques. B.o.T. (Ref. CRE (IB) 65151/50).*

Oct. 11.—Wellington (N.Z.) 12 moving coil (d.c.) voltmeters for N.Z. Post Office (Stores Division).

Oct. 14. — Pakistan. Diesel-driven centrifugal pumping sets capable of delivery of 4,000 galls per hour, for Dept. of Supply and Development, Frere Rd., Karachi. B.o.T. (Ref. CRE (IB) 64930/50).*

Oct. 19.—Wellington (N.Z.). 3,000 ft of instrument cordage. N.Z. Post Office (Stores Division).

Oct. 24.—Persia. Two generators, two each diesel power units, 250 kW, 294 kVA, 2,300 V with low piston speed heat exchangers. Dr. Massoud Maleki, Economy and Purchase Dept., Rue Amirieh, Shahpur Ave., Tehran. B.o.T. (Ref. CRE (IB) 63961/50).*

Oct. 24.—Wellington (N.Z.) 250 miles of cadmium copper wire. Director-General (Stores Division), G.P.O., Wellington C.1.

Oct. 25.—Cape Town. Supply of 3,800 230 V electric lamps for City Electricity Department. B.o.T. (Ref. CRE (IB) 63948/50).*

Oct. 25.—Queensland. L.t. pin-type and shackle insulators, medium and h.t. pin-type and shackle insulators, guy strain and disc type insulators, and metal fittings for disc insulator. Secretary, State Electricity Commission, Scottish Union House, Eagle St., Brisbane.

Oct. 25.—Queensland. 22 kV air break switches and earth leakage protection equipment for State Electricity Commission, Eagle St., Brisbane.

Oct. 25.—Queensland. 560,000 yd of hard drawn copper cable of various sizes for Cairns Regional Electricity Board. State Electricity Commission, Scottish Union House, Eagle St., Brisbane. B.o.T. (Ref. CRE (IB) 64902/50).*

Oct. 26.—Brisbane. Metal-clad switchgear, 6 panels, 33 kV (3 feeder, 1 transformer, 1 bus tie and 1 bus section), 8 current transformer sets included in the panels, for City Electric Light Co. Ltd. B.o.T. (Ref. CRE (IB) 64304/50).*

Oct. 30.—Wellington (N.Z.). Supply of 1,000 kVA and 750 kVA distribution transformers for electricity dept. Electricity House, Cuba St., Wellington.

Oct. 31. — Bloemfontein T.C. One turbo-alternator, condenser and auxiliary apparatus. Merz and McLellan, 1,419 Escon House, Rissik St., Johannesburg. Deposit £2 2s.

Nov. 1.—Queensland. Copper jointing sleeves, switchgear, fuses and lighting arresters, line construction material for Townsville Regional Electricity Board. State Electricity Commission of Queensland.

Nov. 4.—Egyptian Govt. One 25,000 kW turbo-generator (or two units totalling the same power) and two boiler units complete with auxiliary switchgear and transformer, for Cairo North station. Chief inspecting engineer, Egyptian Government, 41 Tothill Street, London S.W.1. Fee £25 12s. 6d.

Nov. 4.—Egypt. Supply and erection of turbo-alternator of 20-25,000 kW and 2 boiler units, at Cairo North Power Station for Cairo City Electricity and Gas Administration. B.o.T. (Ref. CRE (IB) 63682/50).*

Your Queries — Answered

"Genwinds" vacuumcleaners, makers of? T.E.—Genwinds (Prompt Elec. Service Ltd.), Bentley Heath, Knowle, Birmingham. (18769)

"Jablo" toasters, makers of? T.E. — Moulded Components (Jablo) Ltd., Jablo Works, Waddon Estate, Mill Lane, Croydon. (18774)

"Xylonite", makers of? T.E.—British Xylonite Co., Ltd., Larks Hall Rd., E.4. (18782)

"Articair" refrigerator, makers of? H.G.—Pel Ltd. of Oldbury, Birmingham, have stated that they did not take over this part of the business of British Ideal Patents and Furniture Ltd. Time Engineers of 60 Southend Rd., Rainham, Essex, are able to undertake repairs but are not in a position supply spares. (18702)

"V" superimposed on "P" bearings, makers of? R.O.—Vandervell Products Ltd., Western Ave., W.3. (18787)

"Hammond" clocks, repairers of? F.R.—Boosey and Hawkes Ltd., 295 Regent St., London W.1. (18792)

"Mitchell" industrial mixers, makers of? T.E.—L. A. Mitchell Ltd., 37 Peter St., Manchester 2. (18796)

The above are selected from questions we have answered this week. If you have a query, send it to us.

ANSWER WANTED

"Marris" low-voltage kettle, makers of? M.I. (18803)

Nov. 6.—S. Rhodesia. Eight transformers between 1,000 and 5,000 kVA for Electricity Supply Commission. Secretary, P.O. Box 377, Salisbury. B.o.T. (Ref. CRE (IB) 64994/50).*

Nov. 7.—Wellington (N.Z.). One 50 MVA 220/110/11 kV transformer bank and spare unit, comprising four auto-transformer units, each 16,667 kVA 127/63·5/11 kV, oil immersed and water cooled for Roxburgh power station. Contract No. 158, State Hydro-Electric Dept., Wellington. Deposit £100. B.o.T. (Ref. CRE (IB) 61858/50).*

Nov. 14.—Wellington (N.Z.). 110 kV outdoor switchgear and steelwork for Kinleith substation for State Hydro-Electric Department. Deposit £100.

Nov. 15.—India. 33 kV transmission line and substations, and protected type telephone equipment for transmission line for Electrical Engineer to Govt., Government of Saurashtra, Rajkot. B.o.T. (Ref. CRE (IB) 65463/50).*

Nov. 16.—Portuguese West Africa. Transmission line from Mabubas hydro-electrical power station to substation at Luanda. Directorate General of Colonial Development, 12 Praca do Principe Real, Lisbon. Provisional deposit of £4,375 with Bank of Angola, Lisbon, B.o.T. (Ref. CRE (IB) 62304/50).*

Nov. 21.—Australia. Television equipment comprising transmitter, electron tubes, radiating system, intercommunication equipment, radio link and outside broadcast equipment, sound reproducing and recording equipment, programme monitors, studio lighting and testing and measuring equipment for Deputy Director, Posts and Telegraphs, Melbourne, C.1. Supply Branch, Room 406, Australia House, Strand, W.C.2.

Nov. 28.—Melbourne. Three steam generators for Dept. of Public Works, Melbourne. B.o.T. (Ref. CRE (IB) 65170/50).*

Nov. 28.—Wellington (N.Z.). 50 kV outdoor switchgear and structure for Gisborne substation for State Hydro-Electric Department. Deposit £100.

Dec. 13.—Queensland. Switchgear, relays and carrier current equipment, for Tully Falls. State Electricity Commission on behalf of Cairns Regional Electricity Board.

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Tuesday evening)

	£ s. d.	New York price
COPPER, electrolytic	202 0 0	£196 0 0
Delivered in 2nd and 3rd month after order	215 10 0	—
Delivered in 4th, 5th and 6th month after order	217 0 0	—
LEAD, good soft pig (foreign)	128 0 0	128 0 0
,, ,, ,, ,, "English" quality	129 10 0	—
Delivered in 2nd and 3rd month after order, plus	7 0 0	—
TIN (99·99·75%) (Cash)	811½-812	—
,, (3 months)	800-801	—
ALUMINIUM, commercial purity (del.)	112 0 0	—
ZINC	147 10 0	140 0 0
ARMOURING:		
Galv. Steel Wire (0.104 in.)	45 10 0	—
Mild Steel Tape (0.04 in.)	26 0 0	—

Dec. 13.—Queensland. 14 transformers between 250 kVA and 20,000 kVA for Tully Falls Power Station, and Cairns, Innisfail, Golden Grove and Mt. Garnet substations. Secretary, State Electricity Commission, Scottish Union House, Eagle St., Brisbane.

Jan. 17.—Uruguay. Fuel supply installations, turbo-alternators, equilibrating machine, pumps, valves and electric equipment for circulating water, filtering equipment, h.t. cells, control board, transformer substation, accumulators for thermo-electric power station. Usinas Electricas y Telefonos del Estado. B.o.T. (Ref. CRE (IB) 60735/50).*

CONTRACTS PLACED

Dundee. Electrical installations in Albert Institute. George Smith, Engineers (Dundee) Ltd., £6,583.

Wisbech. Electrical engineering services in Bowthorpe Hall Maternity Home. P. H. Allin and Sons, Cambridge, £5,089 (subject to M.H. approval).

TRADE NOTES

Area Office.—Bill Switchgear Ltd. have opened an area office and stores at 58 Wood St., Manchester, under the charge of their area manager, Mr. H. H. Pollard.

Change of Address.—The Electric Meter Co., formerly of Torquay, has moved to Castor Rd., Brixham. Tel.: Brixham 3284.

Beama Contract Price Adjustment Formulae.—For purposes of calculating variations in (a) "Rates of Pay"—the rate of pay for adult male labour at Sept. 9, 1950, shall be deemed to be 115s; (b) "Costs of Material"—the index figure for Intermediate Products last published by the Board of Trade on Sept. 9 is 295.6 and is the figure for the month of Aug., 1950.

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

George Morrison (Electric Lighting and Plating) Ltd. Petition for winding-up will be heard at Court House, Blackpool, on Oct. 12. Persons intending to appear must notify Edward Lloyd and Co., 31 North John St., Liverpool, by Oct. 11.

Southdown Refrigeration and Equipment Co. Ltd. Resolution for voluntary winding-up passed at a meeting on Sept. 18. David Morgan, 100 Park St., London, W.1., appointed liquidator.

Appointment of Liquidators

Swansea, South Wales, Scaling and Insulating Co. Ltd., 16 Harbour Rd., have appointed William Glynn Miles, Royal Building, Fisher St., Swansea, as liquidator.

Manchester. A. Franks (wholesale) Ltd., 3 South King St., wholesalers of electrical and photographic goods. David A. Green, 333 Corn Exchange, Manchester 4, appointed liquidator.

BANKRUPTCY ACTS

Receiving Orders

Ashton - under - Lyne. Stanley Frank Bent trading as S. F. Bent and Sons, electrical contractors at 362 Ashton New Rd., Bradford, Manchester. Date of receiving order, Sept. 14, 1950.

Dividends

Birmingham. Frank Robinson, trading as refrigerating and electrical engineer at 100 Henshaw Rd., Small Heath, Birmingham. First and final dividends of 9s. 6d. in £ payable at Official Receiver's office, Somerset House, Temple St., Birmingham 2, on Oct. 10.

Application for Discharge

Stafford. Percy Taylor Bradley, trading as radio engineer at 1 The Arcade, Stafford. Hearing at Shire Hall, Stafford, on Nov. 3.

BUSINESS PROSPECTS

HOME

Accrington. Plans have been approved for building of a college at estimated cost of £25,000.

Birmingham. Construction of 32 maisonettes at Main St. and 18 houses on Hawkesley Farm estate. H. J. Manzoni, City Engineer and Surveyor, Civic Centre, Birmingham 1.

Bishop Auckland U.D.C. Construction of 118 houses on Woodhouse Close estate. Council's Engineer and Surveyor, 50 North Bondgate, Bishop Auckland.

Brighton T.C. Construction of 27, 23, 19 and 22 houses on Coldean estate. D. J. Howe, Borough Engineer and Surveyor 26-30 King's Rd.

Caistor (Lincs.) R.D.C. Erection of 54 bungalows in farming villages has been approved.

Canterbury T.C. Erection of 70 houses at London Rd. site. L. Hugh Wilson, City Architect, Municipal Buildings.

Castle Donington (Leicester) R.D.C. are to erect 24 houses at Belton.

Darlington T.C. Scheme has been approved for traffic signals at Blackwellgate.

Devon. Plans for primary school at Sticklepath have been approved.

Dublin. City Council approved plans for erection of 350 houses at Inchicore.

Durham. R.D.C. is planning erection of 8 houses at Framwellgate Moor, 57 at West Rainton, 196 at Sherburn and 64 at Leamside.

Erpingham (Norfolk) R.D.C. Erection of 20 houses in three parishes. G. L. Evatt, Architect and Surveyor, Council Offices, St. Peter's Rd., Sheringham.

Eston U.D.C. 1951 housing programme includes 126 houses at Grangetown and 66 at Normanby. Surveyor is N. C. Harrison.

Forden (Mon.) R.D.C. Plans approved for erection of 20 houses.

Guildford. Construction of 34 houses at Georgelands, Ripley. Engineer and Surveyor, Millmead House, Guildford.

Hampstead. Erection of 112 flats at Shoot-up Hill and 25 at Lawn Rd. P. H. Harrold, Town Clerk, Town Hall, Haverstock Hill, N.W.3.

Houghton-le-Spring. U.D.C. has received sanction to borrow £54,500 for erection of 48 houses on Barnwell estate.

Lanark. C.C. has approved plans for erection of 124 houses at Chapelhall, 32 at Bailieston and 16 at Carmyle.

Langport (Somerset) R.D.C. Erection of 16 houses in Kingsbury Episcopi. Architect is N. H. N. Darby, Westminster Bank Chambers, Taunton.

Leeds T.C. Erection of children's homes at Beckett Park, Belle Isle and Ireland Wood estates. City Architect, Priestley House, Quarry Hill, Leeds 9.

London. Erection of £110,000 office building for Edward Lumley and Son Ltd., at St. Mary Axe, E.C.3. Architects are Alan W. Pipe and J. Vermont, 8 Queen St., E.C.4. Tenders yet to be invited.

Loughton (Essex). Hilger and Watts Ltd., propose to erect factory on the Debden estate. Architects are J. France Smith, 219 Knightsbridge, S.W.7.

Market Harborough U.D.C. Erection of 32 houses on Southern estate. Lyndon Bowen, 39 High St.

Northampton. R.D.C. to apply for sanction to borrow £6,230 for provision of 200 refrigerators in council houses.

Offaly. Erection of 33 cottages in Offaly County health district for C.C. County Secretary, Courthouse, Tullamore.

Poole T.C. Erection of 116 houses in seven contracts. Borough Engineer, Municipal Offices, Poole.

Prestwich T.C. Erection of 116 houses on Carr Clough estate. Borough Engineer and Surveyor, Town Hall, Prestwich, Lancs.

Richmond T.C. Surrey C.C. has approved development of new housing estate in Sandy Lane, Petersham, comprising 238 houses.

St. Helens. Erection of infants' school at Carr Mill. Cornall, Kelly and Shelton, Chartered Architects, 8 Hardshaw St.

St. Ives (Hunts). Air Ministry proposes to build 178 houses at Wyton R.A.F. Station.

Shoreham - by - Sea (Sussex) U.D.C. Erection of 30 houses at Hammy Lane estate. Engineer and Surveyor, 31 John St., Shoreham.

South Shields. Erection of 72 flats in six blocks in Prince Edward Rd. East. Borough Engineer, Town Hall, South Shields.

Southwark. Tenders likely to be invited soon for reconstruction of St. George's R.C. Cathedral at estimated cost of £300,000. Architect is Romilly Craze, of Milner and Craze, Flat Y, 3 Buckingham Gate, Westminster, S.W.1.

Sunderland T.C. Tenders are to be invited for installation of electricity in 294 houses on Pennywell estate. H. C. Bishop, Borough Architect, Grange House, Stockton Rd.

Towcester (Northants) R.D.C. Erection of 22 houses and 4 bungalows on Pattishall site. Surveyor's Dept., 163 Watling St. West, Towcester.

Warsop (Notts) U.D.C. Erection of 36 houses at Market Warsop.

West Bridgford U.D.C. Construction of 16 flats on Valley Rd. estate. R. Dewsberry, Engineer and Surveyor, The Hall, West Bridgford, Nottingham.

Worthing T.C. Erection of 56 houses in Barrington Rd. Borough Engineer and Surveyor, Town Hall.

OVERSEAS

India. Intersales (Exports), Ltd., Bassishaw House, Basinghall Street, London, E.C.2, wish to contact British manufacturers of squirrel cage motors from 5 to 15 h.p. and slip-ring motors from 10 to 25 h.p., for supply through a firm of general commercial distributors in India, who have a licence valid for 12 months, to a value of just over £11,000. The firm is also interested in obtaining low-priced alternators and convertors.

U.S.A. Havey Radio Co., Inc., 103 West 43rd St., New York 1, want immediate supplies of carbon resistors. One million resistors is mentioned for initial requirement. Contact Mr. Sam Findling at above address. Also Mr. Roy Howard of Midwest Sales Co., Room 246, Hanna Building, Cleveland, wants radio receiving valves, carbon resistors, coaxial cable and wires.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Nerflama. 689,587. Class 1. Moulding powders for plastics. 689,598. Class 10. Light diffusers made of plastics, Franco-British Electrical Co. Ltd., 15/17 King St., St. James's, London, S.W.1.

Stesco. 678,386. Class 9. Radio sets complete. 678,387. Class 11. Electric lighting fittings, table lamps, lamp-shades, fires and torch cases. Mackavoy and Franks Ltd., 48 Warwick Gardens, London W.14.

Hejostat. 689,404. Class 9. Thermostats. C. E. Jones and L. J. Jones (trading in partnership), 35 Yateley Ave., Gt. Barr, Birmingham 22a.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

William Benson and Co. (London) Ltd., Amberley Hse., Norfolk St., W.C.2. To carry on bus. of heating, cooling, ventilating, elec., mech., and genl. engrs., etc. Nom. cap.: £4,000 in £1 shs. Dirs.: W. R. Benson and Mrs. E. M. Benson.

Prestone Cookers Ltd., 9 Park Pl., Cardiff. To carry on bus. of mnfrs. of and dlrs. in cooking stoves and cooking apparatus, etc. Nom. cap.: £2,000 in £1 shs. Dirs.: to be apptd. by subs. Subs.: I. Griffiths and J. A. Cava.

T. and R.T.S. Ltd., 257 King St., W.6. To carry on bus. of electricians, television, radio and gramophone dlrs., etc. Nom. cap.: £2,000 in £1 shs. Dirs.: W. C. Peckings and F. C. J. Mott.

T. G. Henry (Southport) Ltd., 14a Bridge St., Southport. To take over the bus. of an auto. and elec. engr. cd. on at Southport by R. H. J. Barfoot. Nom. cap.: £5,000 in £1 shs. Geo. Chandler signs as director.

Microwave Instruments Ltd., 21 Ellison Pl., Newcastle-on-Tyne 1. To carry on bus. of designers and mnfrs. of and dlrs. in elec. apparatus and equipment, etc. Nom. cap.: £5,000 in £1 shs. Permt. dirs.: A. W. Wanless and C. W. Coan.

MEETINGS TO NOTE

THURSDAY, SEPT. 28

PURCHASING OFFICERS' ASSOC.—Annual national conference. Hotel Metropole, Brighton (until Oct. 1).

I.E.S. (Bradford group).—"Cold Cathode Lighting Equipment." E. R. Langsdon, Elec. Board, Sunbridge Rd.—7.30 p.m.

SATURDAY, SEPT. 30

I.E.E. (London Students Section). Dance at Victoria Halls, Bloomsbury Sq.

I.E.E. (N. Midland Students' section).—Chairman's Address. "Use of Electricity in Mines." B.E.A., 1 Whitehall Rd., Leeds.—2.30 p.m.

MONDAY, OCT. 2

I.E.E. (S. Mid. Radio Group).—"Economies in Planning, Design and Operation of Sound Broadcasting System." R. T. B. Wynn. Jas. Watt Memorial Inst.—6 p.m.

I.E.E. (S. Mid. Supply Group).—"The Cost and Efficiency of Earthing on Low and Medium Voltage Overhead Line Systems." L. Gosland. Imperial Hotel, Temple St., Birmingham.—6 p.m.

I.E.S. (Sheffield Centre).—Chairman's Address. J. A. Whittaker. The University, Weston Bank.—6 p.m.

I.E.E. (Rugby Sub-Centre).—Chairman's Address. R. T. Coe. E. Mid. Elect. Board Showrooms, High St.—6.30 p.m.

I.E.E. (N. Staffs Sub-Centre).—Chairman's Address. L. Goodall. Elect. Showrooms, Stoke.—7 p.m.

INCORP. PLANT ENGNRS (London Branch).—"The Heat Pump." F. L. Griffiths. Royal Soc. of Arts, John Adam St., W.C.2.—7 p.m.

I.E.E. (Maidstone District Meeting).—"L.T. Industrial Control Gear and its Applications." S. H. Harding. New Inn, Sandling Rd.—7.30 p.m.

I.E.E. (Mersey and N. Wales Centre).—Chairman's Address. J. Eccles. Liverpool Royal Instn., Colquitt St.—6.30 p.m.

SOC. OF ENGRS.—"High Frequency Heating in Industry." K. A. Zandstra. Burlington House, W., 5.30 p.m.

A.S.E.E. (Leeds branch).—"Radio Frequency Industrial Heating." L. L. Preston. Gt. Northern Hotel, Wellington St., 7.30 p.m.

A.S.E.E. (N.E. London branch).—"Modern Industrial Electrical Installations." C. J. Veness. Angel Hotel, Ilford, 8 p.m.

TUESDAY, OCT. 3

INCORP. PLANT ENGNRS (S. Wales Branch).—"Transmission Problems." H. Power. Grand Hotel, Westgate St., Cardiff.—7.30 p.m.

INSTN. OF WORKS MANAGERS (Leicester Branch).—"Factory Discipline." J. Ayres, Brush Electrical Eng. Co., Ltd. Bell Hotel.—7 p.m.

INSTN. OF WORKS MANAGERS (Sheffield Branch).—"The Psychology of Works Management." W. Higgs, Higgs Motors, Ltd. Grand Hotel.—7.30 p.m.

SOC. OF RELAY ENGNRS.—"Medium Voltage Feeders and their Associated Transformer Equipment for Long Distance Transmission of Audio Frequency Power." K. A. Russell of B.R.W., Ltd. Engineers' Club, 17 Albert Sq., Manchester.—2.30 p.m.

I.E.E. (Bristol Students' Section).—Chairman's Address. "Distribution of Electricity in Bristol." Electricity House.—7 p.m.

I.E.E. (E. Midland Centre).—Chairman's Address. R. C. Woods. Loughborough College.—6.30 p.m.

I.E.E. (N. Midland Centre).—Chairman's Address. W. F. Smith. B.E.A., 1 Whitehall Rd., Leeds.—6.30 p.m.

A.S.E.E. (W. London branch).—"Testing and Operation of Modern Electric Metering Equipment." S. W. Stovold. Hammersmith Town Hall, 7.30 p.m.

A.S.E.E. (N.W. London branch).—"Cold Cathode Lighting." E. A. Langsdon. St. Hilda's Hall, Northolt Rd., S. Harrow, 7.45 p.m.

WEDNESDAY, OCT. 4

I.E.S. (Newcastle Centre).—Chairman's Address. J. S. McCulloch. Minor Durrant Hall, Oxford St.—6.15 p.m.

I.E.S. (Swansea Group).—"Church and Chapel Lighting." L. C. Rettig. 4 Northampton Gdns.—5.45 p.m.

I.E.E. (Southern Centre).—Chairman's Address. R. E. S. Soper. 111 High St., Portsmouth.—6.30 p.m.

I.E.E. (Tees-side Sub-Centre).—Chairman's Address. T. A. George. Cleveland Scientific and Tech. Inst., Middlesbrough.—6.30 p.m.

A.S.E.E. (York branch).—"Lubricating Oils." Cdr. B. H. J. Thoms, Royal Station Hotel, 8 p.m.

A.S.E.E. (N. London branch).—"The Supervising Engineer and the National Position." A. Brammer. Three Jolly Butchers Hotel, Wood Green, 8.15 p.m.

INSTN. OF HEATING AND VENTILATING ENGRS. (E. Midlands branch).—"Economics of Automatic Control." T. E. Cunningham. School of Technology, The Newarke, Leicester, 6.30 p.m.

THURSDAY, OCT. 5

I.E.E. (London).—President's Address. Sir Archibald Gill. Savoy Place.—5.30 p.m.

COMBUSTION ENGINEERING ASSN.—Two-day Conference at Palace Hotel, Buxton.

I.E.S. (Cardiff Centre).—"Church and Chapel Lighting." L. C. Rettig. S. Wales Elect. Board, The Hayes.—5.45 p.m.

I.E.S. (Exeter Group).—"Modern Methods of Illumination." C. W. Rawlings. Agricultural House, Queen St.—7 p.m.

BRIT. INSTN. OF RADIO ENGNRS (N.W. Section).—"Education in Industry." Dr. P. F. R. Venables. College of Technology, Manchester.—6.45 p.m.

FRIDAY, OCT. 6

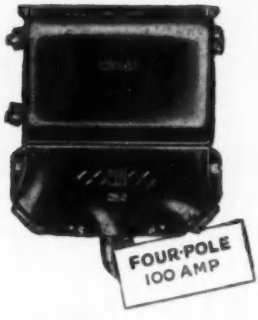
ELECT. TRADES' COMM. TRAVELLERS ASSOC.—Annual dinner-dance at Cafe Royal, Regent St., W.1.

I.E.S. (Bath and Bristol Centre).—"Light, Colour and the Stage." E. E. Faraday. Provident Hall, Prewett St., Bristol.

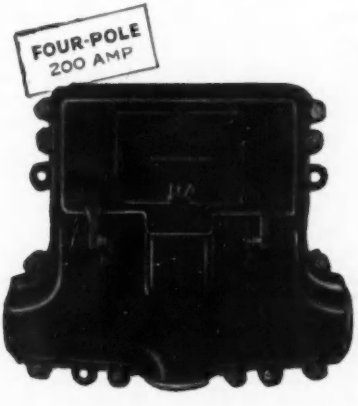
HENLEY

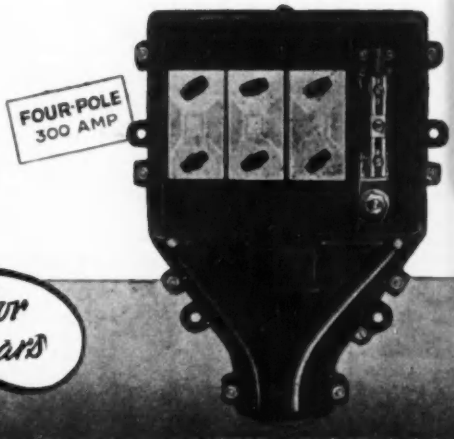
HEAVY DUTY 100-500 AMP

IRONCLAD SERVICE FUSES



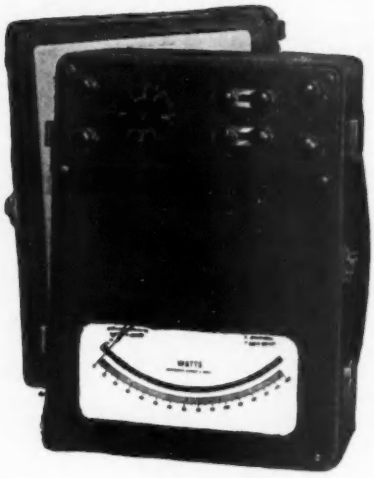
HENLEY Heavy Duty Ironclad Service Fuses, suitable for Henley Wedge Type Cartridge Fuse-links, embody all the essential features necessary to ensure simplicity in installation and reliability in service. Only typical boxes are illustrated; full details available on request.





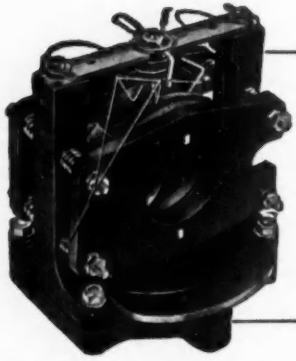
W.T. HENLEY'S TELEGRAPH WORKS CO., LTD., 51-53 HATTON GARDEN, LONDON, E.C.1.

FEATURES OF WESTON SUPERIORITY



Weston
DYNAMOMETER SUB-STANDARD INSTRUMENTS

This latest development of the well-known 'Weston' sub-standard Wattmeter is made in three models, each of high-grade dynamometer type, designed for a wide range of precision measurements. The standard series is particularly suitable for meter standardisation and for use as a transfer standard between A.C. and D.C. circuits. Type 2 is recommended for low power factor circuits and Type 3 for higher power frequencies. Similar in size and design, each is housed in a lightweight Bakelite case, with easy reading 6″ scale, knife-edge pointer and anti-parallax mirror. The moving element is fitted with spring-loaded jewels, double magnetic shielding is employed and each instrument carries a certificate of individual performance and guarantee of accuracy to 0.25%. Ample voltage and current ranges are available by simple switching which can be safely applied when the instrument is on load. Model S67 (as illustrated). Size 11″ × 9½″ × 6½″. Weight 10 lbs. (approx.)



EXTREME RIGIDITY. An unique feature of these 'Weston' models is the self-contained assembly independent of the casing, thus ensuring extreme rigidity. The whole instrument is housed as one complete unit in an attractive Bakelite case with leather carrying strap and detachable cover. Ample shielding and the absence of metal parts eliminate errors due to external magnetic fields and eddy currents.

SANGAMO WESTON LIMITED

ENFIELD, MIDDLESEX.

Telephone: Enfield 3434 & 1242 - - - Telegrams: Sanwest, Enfield.

DEPOTS AT: GLASGOW, NEWCASTLE-ON-TYNE, LEEDS, MANCHESTER, WOLVERHAMPTON, BRISTOL, LIVERPOOL, NOTTINGHAM, SOUTHAMPTON, IPSWICH AND BRIGHTON.

121

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia St., W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 35s. per inch, and all other classified advertisements at 2s. 6d. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

COUNTY BOROUGH OF SWANSEA

Penlan Primary School, Penlan, Swansea

TENDERS FOR ELECTRICAL INSTALLATION

FIRMS wishing to tender for the Electrical Installation at Penlan Primary School, now in course of erection at Penlan, Swansea, are invited to submit their applications to the Borough Architect, The Guildhall, Swansea, on or before October 16, 1950.

Plans, specifications and conditions of contract can be obtained on application and deposit of £2, provided the applicant gives satisfactory evidence of having previously carried out work of a similar character.

The deposit will be refunded after delivery of a bona fide tender (which is not subsequently withdrawn), and the return of all documents.

No guarantee is given that the lowest or any other tender will be accepted.

T. B. BOWEN,
Town Clerk.

The Guildhall, Swansea. (G 198)

CITY OF MANCHESTER

THE EDUCATION COMMITTEE invites tenders for the Electrical Installation at Newall Green Infants' School, Wythenshawe, Manchester.

Specification and drawings may be obtained at the office of the City Architect, Town Hall, upon payment of £1 1s., which sum will be returned upon receipt of bona fide tender. All cheques and postal orders are to be made payable to the order of "The Corporation of Manchester", and crossed.

Sealed tenders, enclosed in the official envelope, to be delivered at the Education Offices, Deansgate, Manchester 3, not later than 10 a.m. on Monday, October 30, 1950.

The Corporation do not bind themselves to accept the lowest or any tender.

PHILIP B. DINGLE,
Town Clerk.

Town Hall, Manchester.
September, 1950. (G 197)

APPOINTMENTS VACANT

BRITISH ELECTRICITY AUTHORITY

Contracts Department, Headquarters, London

SENIOR ASSISTANT CONTRACTS OFFICER

APPLICATIONS are invited for the post of Senior Assistant Contracts Officer in the Contracts Department at the Authority's Headquarters in London.

The salary for the appointment, which is superannuable, will be within the provisional salary range of £1,000 to £1,500 per annum, the point of entry being dependent upon qualifications and experience.

Duties will include the critical examination, assessment and comparison of all commercial aspects of tenders submitted in connection with the wide range of plant purchased by the Authority.

Candidates should have considerable experience of the negotiation of major contracts with the manufacturers with which the Authority deals, possess keen analytical ability and the faculty of presenting data in a concise form.

Application forms may be obtained from Secretary's Office (Establishments), Applications Section, British Electricity House, Great Portland Street, London W.1, and should be completed and returned to D. Moffat, Director of Establishments, so as to be received not later than October 14, 1950. Please quote reference AE/99. (G 181)

COUNTY BOROUGH OF HASTINGS

APPOINTMENT OF ASSISTANT ELECTRICAL ENGINEER

APPLICATIONS are invited for the above appointment, at a salary in accordance with Grade APT.V. (£520-£570) to VI. (£595-£660), according to qualifications and experience.

The person appointed will be responsible to the Borough Engineer for the design, installation and maintenance of electric installations for the Corporation, and the duties will be principally in connection with public lighting in the first instance.

The appointment will be subject to the Conditions of Service drawn-up by the National Joint Council and will be terminable by one month's notice on either side. The successful candidate will be required to pass a medical examination for entry into the Superannuation Scheme.

Applicants must be Corporate Members of the Institution of Electrical Engineers or possess equivalent qualifications, and should have had at least ten years' practical experience.

Applications, giving details of age, experience and qualifications, present and previous positions and salary, and accompanied by copies of three testimonials, to be sent to the Borough Engineer and Surveyor, 37 Willington Square, Hastings, not later than 10 a.m. on October 14, 1950.

Canvassing will be a disqualification.

N. P. LESTER,
Town Clerk.
(G 215)

BRITISH ELECTRICITY AUTHORITY

South Western Division

DEPUTY STATION SUPERINTENDENT NEWTON ABBOT POWER STATION

APPLICATIONS are invited for appointment as Deputy Station Superintendent at Newton Abbot Power Station, Class "F," Grade 3, £827-£865 per annum.

The successful applicant will be responsible to the Station Superintendent for the efficient operation and maintenance of the station and will be required to deputise for him in his absence. Candidates should preferably be Corporate Members of the Institution of Mechanical Engineers, the Institution of Electrical Engineers, or hold equivalent qualifications.

Salary and conditions of service will be in accordance with the National Joint Board Agreement.

The appointment will be superannuable under the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications, stating age, qualifications, experience, present appointment and salary, should be addressed to the Divisional Secretary, British Electricity Authority, South Western Division, British Electricity House, 26 Oakfield Road, Bristol 8, so as to be received not later than October 12, 1950.

R. C. BARRETT,
Divisional Secretary.
September 21, 1950. (G 220)

BRITISH ELECTRICITY AUTHORITY

North Western Division

APPLICATIONS are invited for the position of STATION SHIFT CONTROL ENGINEER at Ribble Generating Stations, Penwortham, Preston.

The salary will be in accordance with Grade 10, Class "H," of the Revised N.J.B. Schedule, i.e. £571-£597 per annum

Applicants should have had experience in the operation of large turbo-alternators, and e.h.v. switchgear, and possession of technical qualifications is desirable.

Applications, stating age, qualifications, present position, and full details of education and experience, should be received by The Establishment Officer, British Electricity House, Wilmslow Road, East Didsbury, Manchester 20, not later than October 7, 1950. (G 219)

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments :—

No. 2 (Huddersfield) Sub-Area

FIRST ASSISTANT DISTRICT ENGINEER (Huddersfield District) (Vacancy No. 51/50).

Applicants should be Corporate Members of the Institution of Electrical Engineers or possess equivalent qualifications and must have had experience in the design, construction, operation and maintenance of h.v. and l.v. overhead and underground distribution networks, substation plant and ancillary apparatus. The successful candidate, who will be required to reside in the Huddersfield District, will be responsible to the District Engineer and must be capable of preparing complete schemes and estimates.

Salary: N.J.B. Schedule Class "G," Grade 5, £749 £783 per annum.

Applications, stating the above vacancy number, and giving full details of age, qualifications, and experience, should be forwarded to the Manager, No. 2 (Huddersfield) Sub-Area, Yorkshire Electricity Board, Market Street, Huddersfield, within fourteen days of the appearance of this advertisement.

No. 3 (Sheffield) Sub-Area

GENERAL ASSISTANT ENGINEER (Distribution Design) (Vacancy No. 52/50).

Applicants must hold at least the Higher National Certificate in Electrical Engineering and should have had construction experience on overhead and underground distribution systems up to 11 kV. Experience in planning and estimating will be an advantage.

Salary: N.J.B. Schedule Class "M," Grade 13, £590 £610 per annum.

Applications, stating the above vacancy number, and giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 3 (Sheffield) Sub-Area, Yorkshire Electricity Board, Commercial Street, Sheffield, within fourteen days of the appearance of this advertisement.

COUNTY BOROUGH OF GREAT YARMOUTH

Education Committee

TECHNICAL INSTITUTE

Principal: J. PARKIN, B.Sc.

REQUIRED to commence duty as soon as possible, FULL-TIME INSTRUCTOR qualified to take mainly ELECTRICAL ENGINEERING and INSTALLATION WORK with part-time day and evening students for National Certificates in electrical engineering and City and Guilds installation certificates.

Salary in accordance with the Burnham (Technical) Report. Further details obtainable from the undersigned on receipt of a stamped addressed foolscap envelope.

D. G. FARROW
Chief Education Officer.

Education Offices,
22 Euston Road, Great Yarmouth. (G 229)

SOUTH WESTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments in the Cornwall Sub-Area with headquarters at Pool, Redruth :—

1. SECOND ASSISTANT ENGINEER (Planning and construction). Commencing salary £651 per annum in accordance with Class "G," Grade 7, of the N.J.B. Schedule.

Candidates should have had considerable experience with rural distribution systems, with particular reference to the preparation and costing of distribution schemes and general plant work associated with new and augmentation schemes.

2. THIRD ASSISTANT ENGINEERS (construction, maintenance, technical.) Commencing salary £539 per annum, in accordance with Class "G," Grade 10, of the N.J.B. Schedule.

(a) CONSTRUCTION.—Candidates must have had previous experience in the field erection of l.v. 11kV and 33kV lines, and sub-stations. Knowledge of h.v.u.g. cables and civil work would be an advantage.

(b) MAINTENANCE.—Candidates must have had previous experience in the maintenance of 11kV and 33kV o.h. lines and sub-stations.

(c) TECHNICAL.—Candidates should have had experience in the drawing up of specifications for major 33kV sub-stations and the testing and commissioning thereof. A thorough knowledge of the principal types of transformer and feeder protection, and the ability to carry out S.C. MVA and other system calculations is essential.

Suitable technical qualifications for all the above positions would be an advantage.

Successful candidates will be liable to transfer within the Sub-Area. Applications, giving age, present appointment and salary, also details of qualifications and experience, should be submitted to: A. C. Owen Esq., M.C., Sub-Area Manager, South Western Electricity Board, Pool, Redruth, Cornwall, within ten days. (G 204)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following appointment:

ASSISTANT EFFICIENCY ENGINEER
Little Barford Generating Station

Salary in accordance with the revised N.J.B. Schedule, Grade 9, Class "G" (£571 to £597 per annum), but may be subject to negotiation through the N.J.B.

Applicants should hold associate membership qualifications of the Institutions of Mechanical or Electrical Engineers or other equivalent qualifications and have had previous experience in a large generating station.

A knowledge of instrument maintenance and calibration is desirable and preference will be given to candidates who have had experience with P.F. equipment.

The successful applicant will be required to assist in ensuring that all sections of the generating station plant attain efficiency and economy of operation, the preparation of statistics and the keeping of technical records.

The appointment will be superannuable in accordance with the British Electricity Authority and Area Boards Superannuation Scheme.

Applications, stating age, experience and present position, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to arrive not later than October 6, 1950. Envelopes should be endorsed "Assistant Efficiency Engineer—Little Barford."

W. N. C. CLINCH,
Controller.

Northmet House,
Southgate, N.14. (G 158)

SOUTH EASTERN ELECTRICITY BOARD

Brighton and Hove District

DISTRICT COMMERCIAL ENGINEER

SALARY £767 per annum, rising to £803 per annum under the N.J.B. Schedule, Class "F," Grade 4. Superannuation will be arranged. District has 83,000 consumers, sells 186 million units per annum. The Commercial Department covers: Sales (four showrooms); contracting; consumer service; and large apparatus repair workshops. The successful candidate will be responsible to the District Manager for the organisation and control of the department and for negotiations for supply and tariffs with all classes of consumer, the preparation of commercial statistics and data. Candidates should be qualified engineers, with extensive similar experience in an electricity commercial department.

Applications, giving two referees, must reach E. H. Skinner, Esq., M.I.E.E., Brighton and Hove Manager, South Eastern Electricity Board, Electric House, Castle Square, Brighton, by October 16, 1950.

Surrey Sub-Area

ASSISTANT SUB-AREA COMMERCIAL ENGINEER
(REPAIR SHOP SUPERINTENDENT)

Salary, £685 per annum, rising to £715 per annum under the N.J.B. Schedule, Class "J," Grade 8. Superannuation will be arranged. Successful applicant will organise and supervise the work of the Sub-Area reconditioning and repair depot, with staff of 100 employees. Applicants should have experience in modern workshop practice, preferably in the reconditioning of all types of domestic electrical appliances, and a knowledge of office and stores procedure. Preference to corporate members of the I.E.E., or I.Mech.E. or equivalent qualifications.

Applications, giving two referees, must reach C. W. Hughes, Esq., B.Sc., M.I.E.E., Surrey Manager, South Eastern Electricity Board, Rough Rew, Horsham Road, Dorking, Surrey, by October 9, 1950.

A. L. BURNELL,
Secretary.

September, 1950. (G 218)

SOUTH WESTERN ELECTRICITY BOARD

Exe Valley (Tiverton) District

APPOINTMENT OF DISTRICT ENGINEER

APPLICATIONS are invited for the appointment of District Engineer, Exe Valley (Tiverton) District, in the Taunton Sub-Area with headquarters at Tiverton, at a commencing salary of £653 per annum (Class "B," Grade 3, of the N.J.B. Schedule).

The successful applicant will be responsible for the construction, operation and maintenance of the distribution system, including protective gear in the District.

His duties will include the planning and construction of overhead and underground lines and sub-stations, and the supervision of men.

Corporate Membership of the Institution of Electrical Engineers will be an advantage.

Applications, giving age, present appointment and salary, and details of qualifications and experience, should be submitted to: H. T. Corrigan, Esq., Assoc.I.E.E., District Manager, South Western Electricity Board, 12 Angel Hill, Tiverton, Devon, within ten days. (G 202)

BRITISH ELECTRICITY AUTHORITY

North Eastern Division

APPOINTMENT OF
POWER STATION SUPERINTENDENT
DUNSTON "A", DUNSTON "B" AND BLAYDON POWER STATIONS GROUP

APPLICATIONS are invited for the position of Power Station Superintendent to cover the above-mentioned group of power stations. The total capacity of the group is 349,625 kW.

Applicants should have received a thorough technical and practical training followed by a wide experience in the operation and maintenance of generating plant.

Applicants should have also held a position of responsibility involving the control of technical, operating and administrative staffs. The successful applicant will be expected to reside within a reasonable distance of the power stations.

The salary for this appointment will be in accordance with the National Joint Board Schedule A, Grade 1, Class "K" (£1,310-£1,372 per annum).

Superannuation will be in accordance with the British Electricity Authority and Area Boards Superannuation Scheme.

Forms of application may be obtained from the Divisional Secretary (Establishments), British Electricity Authority, North Eastern Division, Carliol House, Newcastle-upon-Tyne 1, to whom they should be returned to arrive not later than October 14, 1950. (G 221)

MIDLANDS ELECTRICITY AUTHORITY

North Staffordshire Sub-Area

JUNIOR CONSUMERS' ENGINEER—STONE

APPLICATIONS are invited for the above post in the North Staffordshire Sub-Area.

Applicants should have had a sound technical training. They will be required to prepare schemes and estimates for wiring installations, assist in the maintenance and development of consumer service and in supervising service centres. Appropriate technical qualifications will be considered an advantage.

The appointment will be in accordance with National Joint Board conditions and the salary, subject to negotiation, will be Class "D," Grade 12 £403-£415 per annum.

Applications, stating age, experience, qualifications and present position, should be sent to H. A. P. Caddell, Manager, North Staffs Sub-Area, Midlands Electricity Board, 31 Kingsway, Stoke-on-Trent.

A. STEPHENS,
Secretary.
(G 225)

SOUTH EAST SCOTLAND ELECTRICITY BOARD

Edinburgh Sub-Area

TECHNICAL ASSISTANT—DRAWING OFFICE

THERE is a vacancy for a Technical Assistant to take charge of the Drawing Office under the Planning Engineer. The salary offered is Grade 10, Class "H," £571 rising to £599, and is in accordance with the National Joint Board Agreement and the post is superannuable. The work of the Drawing Office is largely concerned with surveying and recording the cable distribution system of Edinburgh. Work arises from time to time, however, for which it is desirable the applicant should understand simple mechanical design and should also have some knowledge of building construction. The post calls for administrative skill and to the right man it may well lead to promotion in the industry.

Applications are invited, and should state age, training, qualifications and experience, and should be addressed to the Edinburgh Manager, South East Scotland Electricity Board, 3 Dewar Place, Edinburgh 3, reaching him not later than 14 days after the publication of this notice. (G 185)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the position of STATION CHEMIST at Earley Generating Station.

Applicants should be fully qualified industrial chemists, with practical experience of fuel water and oil testing. A knowledge of boiler chemistry for high steam pressures and temperatures will be an advantage.

The terms and conditions of service will be those approved by the National Joint Board and the salary, which is provisional and subject to negotiation, will be in accordance with Class "G," Grade 7 (£651 to £679).

The post is superannuable and subject to a satisfactory medical examination.

Forms of application may be obtained from the undersigned and must be returned by October 13, 1950.

P. D. A. OLIVER,
Divisional Secretary.

British Electricity House,
High Street, Portsmouth.
21.9.50. (G 223)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

DRAUGHTSMEN

APPLICATIONS are invited for positions as Draughtsmen at the Divisional Headquarters, Barker Gate, Nottingham, from persons with experience in one or more of the following branches of work in connection with the construction of generating stations.

(a) ELECTRICAL ENGINEERING. (i) General design, assembly and layouts of h.t. and auxiliary switchgear, transformers cables.

(b) MECHANICAL ENGINEERING. With experience on the layout and design of conveyor plant. Coal handling equipment and material handling of station auxiliaries.

(c) CIVIL ENGINEERING. With experience on the design and/or details of reinforced concrete structures, piled foundations, retaining walls, etc., associated with light and heavy plant installations.

The salary will provisionally be within the range £450 to £550 per annum.

The salary range quoted is to be regarded as provisional until final scales have been negotiated with appropriate organisations, and superannuation will be under terms approved by the British Electricity Authority.

Applications must be submitted on the official form, which may be obtained from the Divisional Establishments Officer, British Electricity House, Barker Gate, Nottingham, and should be returned not later than October 23, 1950.

W. S. BURGE,
Divisional Controller.

British Electricity House,
Barker Gate, Nottingham. (G 155)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

APPLICATIONS are invited for the position of STATION SHIFT CONTROL ENGINEER at Meaford Generating Station, Class "G," Grade 10, commencing salary £539 per annum.

Applicants should possess the Higher National Certificate in electrical engineering or equivalent qualifications, and should have had sound technical training and practical experience in the control and operation of steam generating plant and main switchgear.

Salary and conditions of service will be in accordance with the N.J.B. Agreement, and superannuation under terms approved by the British Electricity Authority.

Applications should be made on forms which may be obtained from the Divisional Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, and be returned not later than October 14, 1950.

F. W. LAWTON,
Divisional Controller.
(G 186)

MIDLANDS ELECTRICITY BOARD

North Staffordshire Sub-Area

APPOINTMENT OF PURCHASING OFFICER

APPLICATIONS are invited for the above position at the North Staffordshire Sub-Area Headquarters, Stoke-on-Trent.

Applicants should have an electrical engineering background to their experience, which should include knowledge of the markets in general electrical supplies, equipment, and appliances and of stock control. An appropriate technical qualification will be an advantage.

The appointment will be in accordance with National Joint Board conditions and the salary will be Class "J," Grade 7, £737 to £770.

Applications, endorsed "Sub-Area Purchasing Officer," stating age, qualifications, and experience, present position, and salary should be forwarded within 14 days to: Mr. H. A. P. Caddell, Manager, North Staffordshire Sub-Area, 31 Kingsway, Stoke-on-Trent.

A. STEPHENS,
Secretary.
(G 226)

NORTH WESTERN ELECTRICITY BOARD

No. 5 Sub-Area

LINESMEN (OVERHEAD POWER)

APPLICATIONS are invited for the appointment of Linesmen (Overhead Power) in the Blackburn, Burnley, Clitheroe, Settle and Rossendale Districts of the No. 5 Sub-Area.

Experience in the erection and maintenance of low and high voltage electricity supply lines is essential.

The wages and conditions of service will be in accordance with the agreement of the National Joint Industrial Council for the Electricity Supply Industry, the present rate of pay being 34.0d. per hour.

Applications, stating age, present position and previous experience, should be received by R. H. Harral, Esq., M.I.E.E., M.Inst.F., Sub-Area Manager, No. 5 Sub-Area, The North Western Electricity Board, Jubilee Street, Blackburn, not later than Saturday, October 7, 1950.
(G 187)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for a position as a CHARGE HAND LINESMAN on the staff of the Divisional Transmission Engineer.

Applicants should have had experience in the erection and maintenance of steel lattice towers carrying steel covered aluminium and copper conductors up to voltages of 132 kV. They should also be experienced in the stringing of conductors and making conductor joints. The successful applicant must be capable of taking charge of an overhead line gang.

The conditions of service and wages will be in accordance with the terms agreed by the National Joint Industrial Council.

Applications, giving age, qualifications, and full details of experience and positions held (with dates), should be forwarded to me by October 10, 1950.

P. D. A. OLIVER,
Divisional Secretary.

British Electricity House,
High Street, Portsmouth. (G 224)

THE SOUTH WALES ELECTRICITY BOARD

West Central Sub-Area

APPOINTMENT OF JOINTERS—CLASS I

APPLICATIONS are invited for the positions of Jointers (Class 1) on the establishment of the Sub-Area Engineer, based at Dulais Depot, Pontardulais, near Swansea.

The duties will include the jointing and connecting of all classes of cable.

The conditions of employment applicable to this appointment are as laid down by the National Joint Industrial Council for the Electricity Supply Industry, the present rate of pay being 2s. 11d. per hour for a 44-hour, five-day week.

Applications, stating age, qualifications, experience, and present position, should be addressed to the undersigned so as to reach him within 14 days of the publication of this advertisement.

G. R. T. EDWARDS,
Sub-Area Manager.

Ystrad Road, Fforestfach,
Swansea.
September 23, 1950. (G 216)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following appointment:—

STATION SHIFT CONTROL ENGINEER
Bedford Generating Station

Salary in accordance with the revised N.J.B. Schedule, Grade 10, Class "D." (£465-£481 per annum).

Applicants should have reached the standard of Ordinary National Certificate in Electrical Engineering or its equivalent, have experience in the operation of a switchboard at a generating station and be fully conversant with high tension switching operations and protective systems.

The appointment will be superannuable in accordance with the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications, stating age, experience and present position, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to arrive not later than October 13, 1950. Envelopes should be endorsed "Station Shift Control Engineer—Bedford."

W. N. C. CLINCH,
Controller.

Northmet House, Southgate, N.14. (G 230)

SOUTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the position of ASSISTANT ENGINEER, Mains and Substations, in District 350 (Bridgend, Cowbridge, Maesteg) of the Central Sub-Area of the Board.

Preference will be given to applicants who possess an engineering degree of a British University, the Higher National Certificate or its equivalent, or have passed the Graduateship Examination of the Institution of Electrical Engineers.

The salary for the position will be in accordance with Class "E," Grade 9 (£519, £525, £531) of the National Joint Board Schedule for the Electricity Supply Industry.

Applications, stating age, present position, present salary, qualifications and experience, and whether married or single, together with the names and addresses of three referees, should be addressed to the Secretary (Establishments Section), The South Wales Electricity Board, St. Mellons, Cardiff, so as to reach him not later than October 7, 1950. (G 184)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

APPOINTMENT OF DISTRICT ENGINEER
(AMENDED ADVERTISEMENT FOLLOWING DETERMINATION OF CLASSIFICATION)

APPLICATIONS are invited for the appointment of District Engineer, Liverpool South District, No. 1 Sub-Area, at a salary of £885 per annum in accordance with Grade 3, Classification "G," of the Revised Salary Agreement of the National Joint Board for the Electricity Supply Industry.

Applicants must be Chartered Electrical Engineers and should have had sound experience in the construction, operation and maintenance of sub-stations and large networks both underground and overhead for voltages up to and including 33 kV.

The Liverpool South District is mainly urban in character, but contains some rural territory and extensive industrial developments are proceeding.

The successful applicant may be required to satisfy the Board's medical adviser and, if eligible, will be required to contribute to a Superannuation Scheme.

Application forms, obtainable by written request from the Manager, No. 1 Sub-Area, Merseyside and North Wales Electricity Board, 24 Hatton Garden, Liverpool 3, should be completed and returned so as to be received by him not later than October 16, 1950.

JAMES RANKIN,
Secretary.
(G 201)

MIDLANDS ELECTRICITY BOARD

North Staffordshire Sub-Area

APPOINTMENT OF FIRST ASSISTANT CONSUMERS' ENGINEER (LEEK DISTRICT)

APPLICATIONS are invited for the above post in the Leek District of the North Staffordshire Sub-Area.

Applicants should have had a sound technical training, with practical experience of industrial and domestic load development, and in particular contracting work, including maintenance and consumer service. Appropriate technical qualifications will be considered an advantage.

The appointment will be in accordance with N.J.B. conditions and the salary will be Class "E," Grade 6, £627 per annum.

Applications, stating age, experience, and present salary, should be forwarded within seven days to: Mr. P. Thornton Wood, District Manager, Midlands Electricity Board, Station Street, Leek, Staffordshire.

A. STEPHENS,
Secretary.
September 22, 1950. (G 227)

BRITISH ELECTRICITY AUTHORITY

London Division

STATION SUPERINTENDENT—FULHAM GENERATING STATION

APPLICATIONS are invited for this position at Fulham Generating Station, Townmead Road, S.W.6.

Candidates should have had a thorough technical and practical training, followed by a wide experience of the operation and maintenance of large power station plant.

They should also have had experience of administration and have had a successful record in dealing with works management and labour relations.

The salary and conditions of service will be in accordance with the N.J.B. Agreement, Class "K," Grade 1, commencing at £1,360 per annum, including London Allowance.

Applications, stating age, qualifications and experience, should be addressed to the Divisional Secretary, British Electricity Authority, London Division, Ergon House, Horseferry Road, Westminster, S.W.1, to be received within fourteen days of the appearance of this advertisement.

J. N. WAITE,
Divisional Controller.
(G 200)

SOUTH WESTERN ELECTRICITY BOARD

APPLICATIONS are invited for the position of WAYLEAVE OFFICER in the Bristol Sub-Area with headquarters at Bristol, the salary being within Grade 4 of the N.J.C. (Administrative and Clerical Grades Agreement), i.e., £510 p.a. to £570 p.a.

The duties which the successful candidate will be required to undertake include :—

(a) Responsibility for negotiating Wayleaves throughout the Sub-Area and claims for damages arising therefrom;

(b) Preliminary negotiations for the acquisition of Sub-station sites.

Applications, giving age, present appointment and salary, qualifications and experience, to be submitted to E. C. Willis, Esq., F.C.I.S., Sub-Area Manager, South Western Electricity Board, Electricity House, Colston Avenue, Bristol 1, within ten days. (G 203)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the position of a third ASSISTANT ENGINEER (ELECTRICAL) in the Generation Engineer (Construction) Department.

Applicants should be in possession of technical qualifications admitting to corporate membership of a recognised professional institution, preferably have had experience in a manufacturer's works, and possess some knowledge of the layout of large switchgear or cabling installations.

The salary will be within the range £579 to £731 per annum and the conditions of service will be those approved by the National Joint Board.

The post is superannuable and subject to a satisfactory medical examination.

Forms of application can be obtained from the undersigned and must be returned not later than October 13, 1950.

P. D. A. OLIVER,
Divisional Secretary.

British Electricity House,
High Street, Portsmouth. (G 222)

LONDON ELECTRICITY BOARD

METER REPAIRER (MECHANICIAN)

APPLICATIONS are invited for the above vacancy at Lavender Hill, Battersea, S.W.11.

Rates of pay and conditions of employment will be in accordance with the agreement of the National Joint Industrial Council for the Electricity Supply Industry, the present rate being 3/3 per hour, which amounts to £7 3s. per 44-hour 5-day week.

Application forms obtainable from Establishments Officer, 46 New Broad Street, E.C.2, on receipt of addressed foolscap envelope. Please quote ref. EST/M/161/T. (G 217)

AN interesting and progressive position exists for a qualified ELECTRICAL ENGINEER, in connection with the design and development of servo and electro magnetic equipment for aircraft.—Apply, giving age, details of experience and salary required to Mr. G. Orloff, Chief Designer, British Messier, Ltd., Cheltenham Road East, Gloucester. (G 233)

APPLICATIONS are invited by established C.M.A. Company for positions as SALES ENGINEER REPRESENTATIVES from men of ability who have connections with users of mains and wiring cables in Yorkshire, East Midlands and S.E. England areas.—Full particulars to Box No. 1729, Electrical Times. (G 189)

ASSISTANT TO PRODUCTION MANAGER wanted, responsible position in light engineering. Please state full details of experience, age, etc. Housing assistance given. N.W. Lancashire.—Reply in first instance to Box No. 1719, Electrical Times. (G 173)

CABLE JOINTERS for work on 33-kV installations required immediately. Must be prepared to work in any part of the United Kingdom.—Apply, stating age and giving details of experience, to Box No. 1697, Electrical Times. (G 132)

URGENTLY REQUIRED

POWER STATION CHARGE ENGINEERS

by major oil company for service in the Middle East. Applicants must hold at least Higher National Certificate in Electrical Engineering and have had not less than three years' experience in the operation of large modern Steam Power Stations with thorough knowledge of the routine operation of water-tube boilers, turbo-alternators, E.H.T. switchgear and auxiliary plant. Present position in this country should be not less than Grade 8a, Class "H" or Grade 8, Class "G" on N.J.B. Scale. Age not over 35 years. Married accommodation available. Commencing salary not less than £900 per annum PLUS an allowance in the local currency which is liable to variation but which at the present time is equal to £1,400 per annum. Free passages out and home, free medical attention, kit allowance, good leave arrangements, excellent Pension Scheme. Write giving age, personal particulars and full details of qualifications and experience, quoting Dept. F.189, to

Box No. 2550 at 191 Gresham House, E.C.2

(E 204p)

DRAUGHTSMAN with experience of large transformer manufacture required by electrical engineering company in North-East London. Permanent position, with superannuation scheme, for suitable applicant. Good salary and working conditions. Write, stating age, experience and salary required, to Box No. 1685, Electrical Times. (G 63)

DRAUGHTSMAN, Senior Electrical Design, 30-45 years, with Higher National Certificate and good knowledge industrial lighting and power installations, with special reference to automatic control gear. Write, stating age, experience and salary desired, to Staff Officer, Imperial Chemical Industries Ltd., Metals Division, Witton, Birmingham 6. (G 195)

DRAUGHTSMEN with experience in the fabrication of large steel tanks and vessels required by electrical engineering company in North-East London. Permanent position, with superannuation scheme, for suitable applicants. Good salary and working conditions.—Write, stating age, experience and salary required, to Box No. 1687, Electrical Times. (G 64)

DRAUGHTSMEN with experience in cable, power, and lighting installation layouts for industrial works. Salaries in accordance with ability and experience. Staff profit-sharing scheme and pension fund.—Apply, stating age and full particulars of experience, to Chief Engineer, The Associated Portland Cement Manufacturers, Ltd., Portland House, Tothill Street, Westminster, London S.W.1. (G 179)

DRAWING-OFFICE STAFF, with experience of electrical cooking design, required by Birmingham manufacturers of industrial equipment. State experience, age, and salary required.—Box No. 1717, Electrical Times. (G 172)

ELECTRICAL DEVELOPMENT ENGINEER required by major British oil company for service in the Middle East in connection with industrial layouts and distribution schemes. Applicants must be graduates of the Institution of Electrical Engineers or equivalent, and practical electrical engineering experience on construction duties in steel works, collieries, or similar plant is desirable. Maximum age limit, 35. Attractive salary, plus generous allowance in local currency, free passages out and home, kit allowance, free medical attention, good leave arrangements, pension scheme.—Write, stating personal particulars and full details of qualifications and experience, quoting Department F.208, to Box No. 2949, at 191 Gresham House, E.C.2. (G 92)

ELECTRICAL DRAUGHTSMAN required for work on new distribution system with possibility of permanent pensionable man. Experience of large industrial plant electrical layouts, diagrams and specifications is desirable.—Applications, giving age, personal particulars and experience, to be addressed to National Oil Refineries, Limited, Llandarcy, Neath, Glamorgan. Envelope to be marked "Electrical Draughtsman." (F 727)

ELECTRICAL DRAUGHTSMAN required by major oil company for service in the Middle East. Must have served five years electrical engineering apprenticeship, and have had five years D.O. experience in connection with electrical layouts of large industrial plants with underground cable networks. Should possess Higher National Certificate. Graduate or associate membership of a corporate engineering body desirable but not essential. Maximum age limit 35 years. Attractive salary plus generous allowance in local currency. Free passages out and home, free medical attention, kit allowance, good leave arrangements. Pension scheme.—Write, giving personal particulars and details of qualifications and experience, quoting Dept. F.192, to Box No. 2809, at 191 Gresham House, Old Broad Street, E.C.2. Applicants without above requirements will not be considered.(F 322)

ELECTRICAL ENGINEER (OR MANAGER) required for iron and steel works.—Applications, giving age, experience, etc., and including photograph, should be submitted, together with salary required, to Box No. 1737, Electrical Times. (G 205)

ELECTRICAL ENGINEER required by tin dredging company in Malaya. Must have extensive practical experience and sound knowledge of theory. Excellent prospects. First contract, three years; six months' leave on full pay on renewal of contract. Basic salary, £560 to £700 per annum, according to experience, plus cost-of-living allowance, £350 per annum for married man, £210 per annum for single man. Free furnished quarters provided. Provident fund and pension scheme.—Written applications, with full particulars of age, education, including studies at evening or technical institute, training, and experience, state whether married or single, and copies of references, to Box No. 4493, Walter Skinner, Ltd., 20 Copthall Avenue, London E.C.2. (G 214)

ELECTRICAL engineering firm in the Harrow area has an opening for a DRAUGHTSMAN. A man competent to deal with mechanical details and some knowledge of electrical work an advantage.—Apply Box No. 1751, Electrical Times. (G.235)

NEW SWITCHGEAR CONSTRUCTION CO., LTD., Sutton, Surrey, have vacancies for SENIOR DRAUGHTSMEN with up-to-date experience of h.t. switchgear. State qualifications, age and salary required. (G 183)

ELECTRICAL ENGINEERS required by major British oil company for several months' training in U.K. in power-station work for eventual service in the Middle East. Minimum qualifications: Higher National Certificate in Electrical Engineering, with one year's industrial experience. A salary is paid while in U.K., together with contribution to cost of living if away from home. Overseas posts offered to successful trainees will carry attractive salary plus a generous allowance in the local currency free passages out and home, free medical attention, good leave arrangements, pension scheme.—Write, giving personal particulars and details of qualifications and career to date, quoting Department F.198, to Box. No. 2946, at 191 Gresham House, E.C.2. (G 93)

ELECTRICAL wiring accessories. CHIEF DESIGNER wanted to take charge of development and engineering in an established organisation in the London area. Applicants should have had several years' experience in a responsible position of design work in both its electrical and mechanical aspects.—Write, giving full details of past experience and salary required to Box No. D.9038, A. K. Advr., 212a Shaftesbury Avenue, W.C.2. (G 96)

PLUMBER JOINTER. Experienced man required immediately for work on cables up to 11 kV. Must be willing to travel.—Details in writing to Box No. 1747, Electrical Times. (G 210)

POWER STATION OR MARINE ENGINEERS. Applications are invited by The Calcutta Electric Supply Corporation, Limited, for appointment to the posts of SHIFT CHARGE ENGINEERS in Calcutta where the company has three generating stations each over 100 MW capacity. Candidates must either have had responsible operating experience in modern large high-pressure steam generating stations, or alternatively must have had marine experience with high pressure water tube boilers and turbines and must hold a 1st class Board of Trade Engineering Certificate; such candidates without previous power station experience would be required, if selected, to undergo a course of training in the U.K. before proceeding to Calcutta. The appointments are permanent and selected candidates will be required to sign an agreement for three years. The monthly salary is in the scale Rs.900-45-1,035 (efficiency bar), 1,075-50-1,275; plus overseas pay minimum Rs.200 monthly; plus overseas marriage allowance Rs.250 monthly (the present rupee exchange is 1s. 6d.). There are in addition other generous allowances including overseas child allowance and cost of living allowance. In addition free furnished quarters are provided, as is also free medical attention. Liberal leave and passage rules, contributory provident fund, etc. Applications, giving age (about 35 to 40 preferred), details of training, experience, present position held, should be addressed to the Secretary, Calcutta Electric Supply Corpn., Ltd., Victoria House, Vernon Place, Bloomsbury Square, London W.C.1. (G 159)

PRODUCTION Control. SENIOR ASSISTANT required, able to control production planning, scheduling, machine shop loading, assembling and progressing. Experience in light electrical engineering essential. Interesting work, with prospects for the right man. Five day week. Canteen. West London district.—Write, full particulars and salary required to: Box No. 1691, Electrical Times. (G 110)

REPRESENTATIVE, age 25-30 years approx., required for the Nottingham area, covering products relating to the electricity supply industry. Technical training should be to a minimum of national Certificate, and preference will be given to candidates with local knowledge and connections. Permanent position with superannuation scheme. Salary according to age, experience and qualifications.—Applications, in writing, to the Staff Officer, British Insulated Callender's Cables, Ltd., Prescot, Lancs. (G 113)

REPRESENTATIVE. Manufacturers require well-connected Sales Representative to handle as additional lines most competitive range of fluorescent fittings, control gear, etc., covering London and Home Counties, Midlands and Northern Counties.—Apply in first instance, Box No. 1749, Electrical Times. (G 211)

SENIOR DESIGNER DRAUGHTSMAN required to take charge of the design and development of all types of on load tap changing gear for high-voltage power transformers. Salary in accordance with experience and qualifications.—Box No. 1731, Electrical Times. (G 191)

SENIOR ELECTRICAL DRAUGHTSMEN required by established British firm with American affiliation. Experience of power distribution and lighting installations, as applied to the oil refinery and chemical industry, essential. Qualifications to H.N.C. standard. Substantial salaries will be paid to suitable applicants.—Write, stating age, qualifications and experience, Foster Wheeler, Ltd., 3 Ixworth Place, London S.W.3. (G 212)

THE Brush Electrical Engineering Co., Ltd., Loughborough, require additional SENIOR TRANSFORMER DRAUGHTSMEN for their drawing office extension. Preference will be given to men having experience of the layout of large transformers. A number of vacancies also exists for JUNIOR TRANSFORMER DRAUGHTSMEN and applications are invited from keen men desirous of obtaining progressive positions. In both instances applicants should write, giving full details of experience, age, etc., to the Technical Director. (G 76)

SIEMENS ELECTRIC LAMPS & SUPPLIES, LTD., require the services of an ILLUMINATING ENGINEER at their Birmingham branch. Applicants between the age of 21-35 years should apply, stating age, experience, and salary required, to I.E. Department, Siemens House, Albert Street, Birmingham. (G 196)

TECHNICAL ASSISTANT for interesting work in small laboratory engaged in development of mass-produced electrical switchgear and control devices in modern West London factory. Minimum qualifications, Ordinary National. Laboratory experience essential.—Box No. 1773, Electrical Times. (G 175)

TECHNICAL ASSISTANT required in Electrical Department of large works in the north-west.—Applications, giving age, details of education, experience, positions held (with dates), and including photograph, should be submitted, together with salary required, to Box No. 1733, Electrical Times. (G 190)

TECHNICAL ENGINEER required for Boiler Design Department, London Area. Higher National or equal essential. Give brief chronological summary of practical and technical training, also appointments held. Salary according to experience and qualifications.—Quote reference W, Mitchell Engineering, Ltd., 12 Gt. Portland Street, London W.1. (G 189)

THE Cameroons Development Corporation require for service in the British Cameroons, JUNIOR ELECTRICAL ENGINEER, about 30 years of age, possessing good technical qualifications, preferably up to Higher National Certificate standard and having good practical experience in design, operation and maintenance of generating plants, overhead distribution systems and commercial and domestic equipment and switchgear, etc. Experience in the operation of diesel engine driving generating plant would be an advantage. Tours are from 18 to 24 months' duration, with generous leave on full pay. Free passage and quarters, outfit allowance £80. Commencing salary in the scale of £870 to £900, plus special allowance ranging from £90 to £108 per annum, also provident fund to which Corporation also pay ten per cent. of salary and allowance.—Applications should be addressed to Rubber & Mining Agencies, Limited, 52 Leadenhall Street, London E.C.3. (G 234)

TOOL DESIGNER, with experience in press tools, bakelite moulds, etc., for consumer moulders in Lancashire. House promised for successful applicant after trial period.—Give full experience and all details to Box No. 1721, Electrical Times. (G 174)

TRANSFORMER DRAUGHTSMEN. Immediate vacancy for Senior with experience up to 100 MVA and Junior with experience up to 5 MVA, also several training vacancies. Yorkshire Electric Transformer Co., Ltd., Empire Works, Dewsbury. (G 114)

WANTED, WORKING CHARGEHAND ARMATURE WINDER for Cardiff. Used to a.c. and d.c. windings. Good technical knowledge. Permanency for suitable man. Union rates.—Box No. 1739, Electrical Times. (G 206)

WELDING SALES ENGINEER, age 25-30 years, with technical training equivalent to Higher National Certificate in Electrical Engineering, to operate in the Home Counties for a well-established company manufacturing resistance welders.—Apply, Box No. 1741, Electrical Times. (G 207)

APPOINTMENTS WANTED

ELECTRICAL DESIGNER DRAUGHTSMAN (33) seeks new appointment. National Certificate, excellent knowledge of electrical engineering, specialising in super tension, impregnated pressure cable on board and in the field.—Box No. 1711, Electrical Times. (G 160)

ELECTRICAL ENGINEER, 20 years' experience manufacturing rotating electrical machinery, desk and ceiling fans, seeks progressive appointment with manufacturers.—Box No. 1725, Electrical Times. (G 176

WORKS MANAGER, extensive knowledge production of electric motors and switchgear, seeks appointment at home or overseas.—Box No. 1727, Electrical Times. (G 177)

WORK WANTED

A.C. and d.c. Motor Rewinds and Repairs. Prompt service, fully guaranteed.—Edgware 8631 (4 lines), Service Electric Co., Ltd., Stanmore, Middx. (D 324)

ARMATURE SERVICE CO., LTD., Haddington Street, Hove (Tel. 32996), electrical engineers and winding specialists. Distance no object. (F 739)

GUARANTEED, high quality Stator and Armature Re-winds, F.H.P. motors, portable tools, etc. Contract rates available.—Sarum Electric, Ltd., Brown Street, Salisbury. Tel. 4245. (G 52)

CASTINGS, Fisher Foundries, Ltd., Greet, Birmingham, have capacity for brass, gun metal and soft grey iron machine moulded repetition castings weighing 1-30 lb. Loose pattern work up to 3 cwt. Delivery by road to all parts Tel.: B'ham, Victoria 0197. (F 270)

STOP WATCHES REPAIRED at a reasonable price. 12 months' guarantee.—J. W. Hughes, Clockwork Engineers, 3 St. Thomas' Street, London Bridge, S.E.1. Tel.: Hop. 2759. (G 164)

ZEROS REFRIGERATORS.—Complete range of repair and service now available. Equipment reconditioned to conform to pre-war manufacturers' specifications.—Time Engineers, Refrigeration Specialists, 60 Southend Road, Rainham, Essex. Tel.: Rainham 2358; or Southern Area Agency. Tel.: Springpark 4217. Electrical Spares supplied to the trade. (A 639)

WANTED

A.C./D.C. MOTORS, STARTERS, complete change-over installations, etc.—A.A. Electrical Co., Ltd., 67 Rothschild Road, Chiswick Park, W.4. Phone: Chiswick 5105. (A 20)

SCRAP ACCUMULATOR PLATES and Sediment wanted, any quantities. Also Storage Batteries purchased and dismantled.—Phone or write Elton Levy Co., Ltd., St. Ermin's (West Side), Caxton Street, London S.W. Phone: WHitehall 9621 2 3. (A 3)

WANTED.—D.C. and a.c. ball-bearing MOTORS.—Full details to Britannia Manufacturing Co., Ltd., 22 26 Britannia Walk, London N.1. (A 13)

WANTED, ROTARY CONVERTERS, any size.—Universal, 221 City Road, London E.C.1. (A 16)

WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of second-hand machinery and plant for re-use.—W. and H. Cooper, Ltd., 176 Brady St., Bethnal Green, E.1. (A 1)

WANTED, TIME SWITCHES of good make. In or out of order.—J. W. Hughes, Clockwork Engineers, 3 St. Thomas' Street, London Bridge, S.E.1. Phone: HOP 2759. (G 2)

WANTED.—Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock Water-tube Boilers. Best prices paid. Prepared to purchase Babcock and Wilcox Water-tube Boilers for dismantling.—Apply, giving full details to Midland Iron and Hardware Co., Cradley Heath. (A 5)

AGENCIES

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INDEX TO ADVERTISERS

A.E.W., Ltd. 76
Alton Battery Co., Ltd. 59
Arrow Electric Switches, Ltd. 9
Ashdowns, Ltd. 58
Attwater & Sons, Ltd. 60
Automatic Coil Winder and Electrical Equipment Co., Ltd. 11
Automatic Light Controlling Co., Ltd. 76
B. & H. (Nottingham), Ltd. 4
Baker Metal Stopper Co., Ltd. 72
Belling & Co., Ltd. 6
Bescol (Electric), Ltd. 34
Booth, James & Co. Ltd. 62
Britannia Batteries, Ltd. 69
British Electricity Authority 14
British Insulated Callender's Cables, Ltd. 25
British Power Transformer Co., Ltd. 32
British Thomson-Houston Co., Ltd. 13, 80
Brook Motors, Ltd. 77
Brush Electrical Engrg. Co., Ltd. 75
Burco, Ltd. 57
Cable Makers Association 30
Carter & Co. (Nelson), Ltd. 4
Chloride Batteries, Ltd. 27
Cole, E. K., Ltd. 32
Courtney, Pope (Electrical), Ltd. 36
Cressall Manufacturing Co., Ltd. 4
Crompton Parkinson, Ltd. 8
D. P. Battery Co., Ltd. 40
Daly (Condensers), Ltd. 36
Diamond H Switches, Ltd. 72
Eagle Engineering Co., Ltd. 62
East London Mica Works 64
Edwards, F. J., Ltd. 76
Electrical Instrument Co. (Hillington), Ltd. 40
Electrical Times 74
Elexcel, Ltd. 23
English Electric Co., Ltd. 1, 29
Ferranti, Ltd. 17
Foster Transformers & Switchgear, Ltd. 28
General Electric Co., Ltd. 20, 44
Grubb Engineering Co., Ltd. 70
Harboro' Rubber Co., Ltd. 74
Hart Accumulator Co., Ltd. 18
Heatrae, Ltd. 16
Henley's W. T. Telegraph Works Co., Ltd. 45
Higgs Motors, Ltd. 10
Huwood Components, Ltd. 18
Igranic Electric Co., Ltd. 35
Imperial Chemical Industries, Ltd. 21
Inductive Appliances Ltd. 56
Isenthal & Co., Ltd. 66
Johnson & Phillips, Ltd. 39, 61
Lancashire Dynamo & Crypto, Ltd. 71
Londex, Ltd. 72
London Electric Wire Co., and Smiths, Ltd. 33
Low, Duncan, Ltd. 66
Metropolitan-Vickers Electrical Co., Ltd. 37
Metway Electrical Industries, Ltd. 12
Nalder Bros. & Thompson, Ltd. 31
National Electrical Contractors Trading Association 55
National Savings Committee 74
Nettle Accessories, Ltd. 64
New Day Electrical Accessories 34
Newton Bros. (Derby), Ltd. 76
Parmiter Hope & Sugden, Ltd. 79
Partridge, Jones & John Paton, Ltd. 63
Renfrew Foundries, Ltd. 19
Resinoid & Mica Products, Ltd. 68
Reyrolle, A. & Co., Ltd. 73
Rozalex, Ltd. 70
Sanders, Wm., & Co. (Wednesbury), Ltd. 68
Sangamo Weston, Ltd. 46
Santon, Ltd. 65
Saxonia Electrical Wire Co., Ltd. 72
Scholes, George H., & Co., Ltd. 38
Scottish Cables, Ltd. 78
Siemens Electric Lamps & Supplies, Ltd. 26
Simmonds & Stokes, Ltd. 58
Simplex Electric Co., Ltd. 2, 15
Slaters Electricals, Ltd. 12
Smith Meters, Ltd. 42
Southern Central Heating Co. 76
Standard Telephones & Cables, Ltd. 41
Stewarts & Lloyds, Ltd. 3
Sunvic Controls, Ltd. 22
T.M.C. Harwell (Sales), Ltd. 67
Tant, W. H. & Co., Ltd. 5
Thorpe, F. W., Ltd. 60
Wakefield, C. C., & Co., Ltd. 7
Walter, D., & Co., Ltd. 68
Wandleside Cable Works, Ltd. 64
Warm-Glow Co., Ltd. 22
Westinghouse Brake & Signal Co., Ltd. 24
Wireohms, Ltd. 74
Wootton & Co., Ltd. 70

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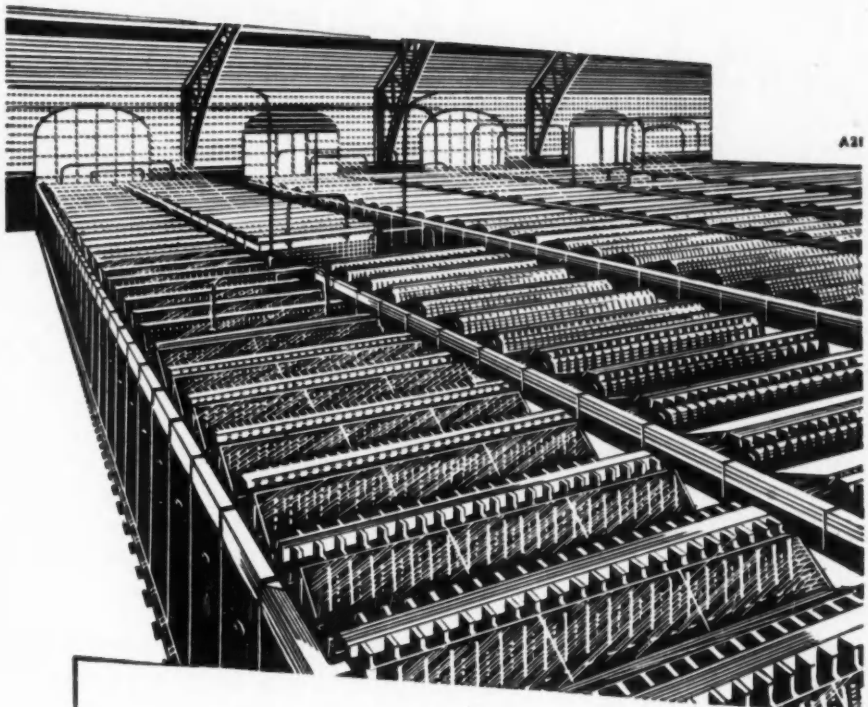

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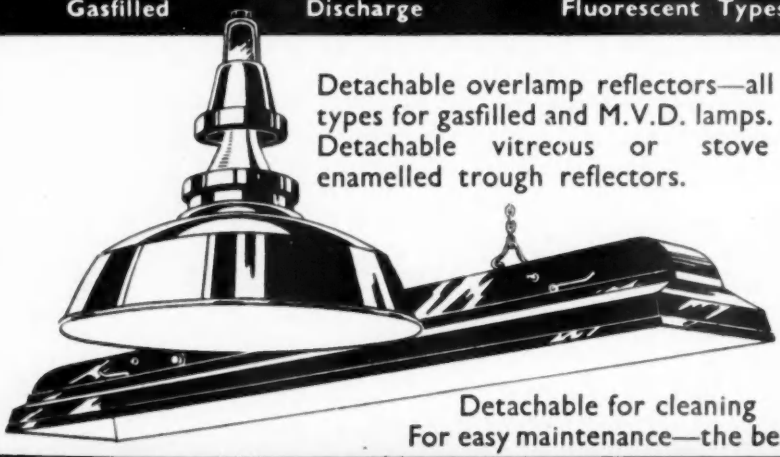

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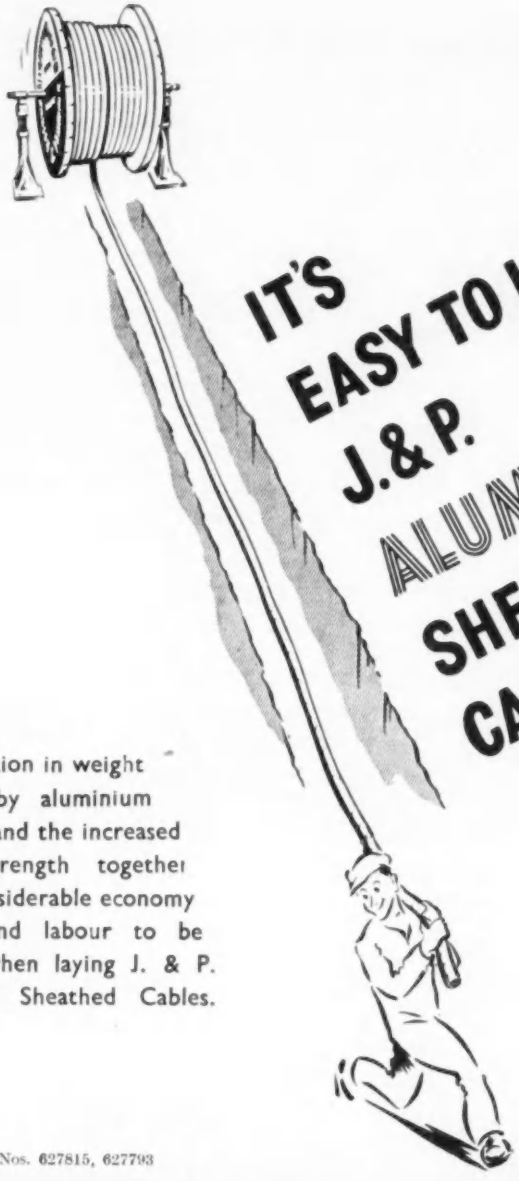

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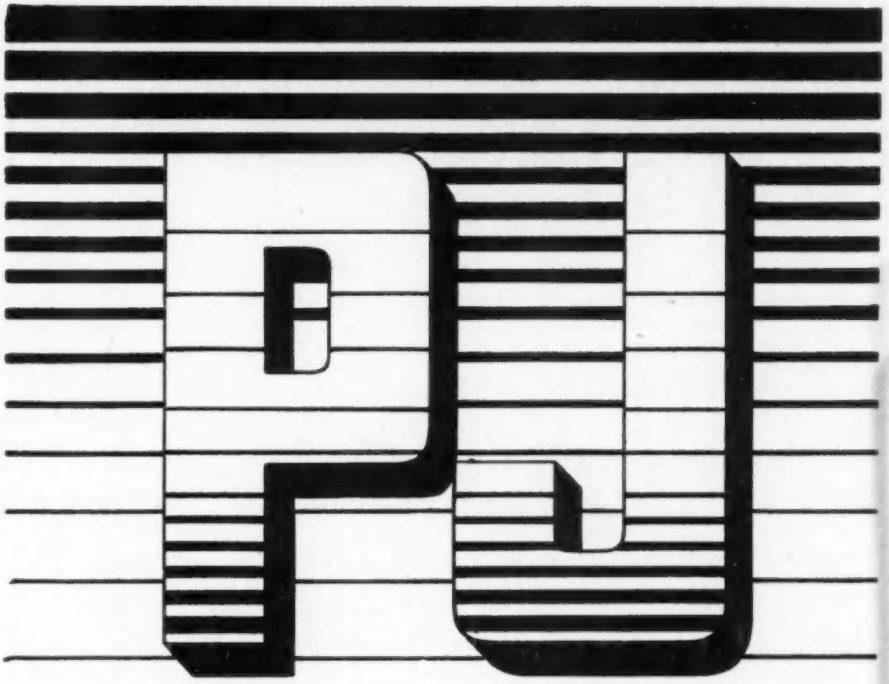

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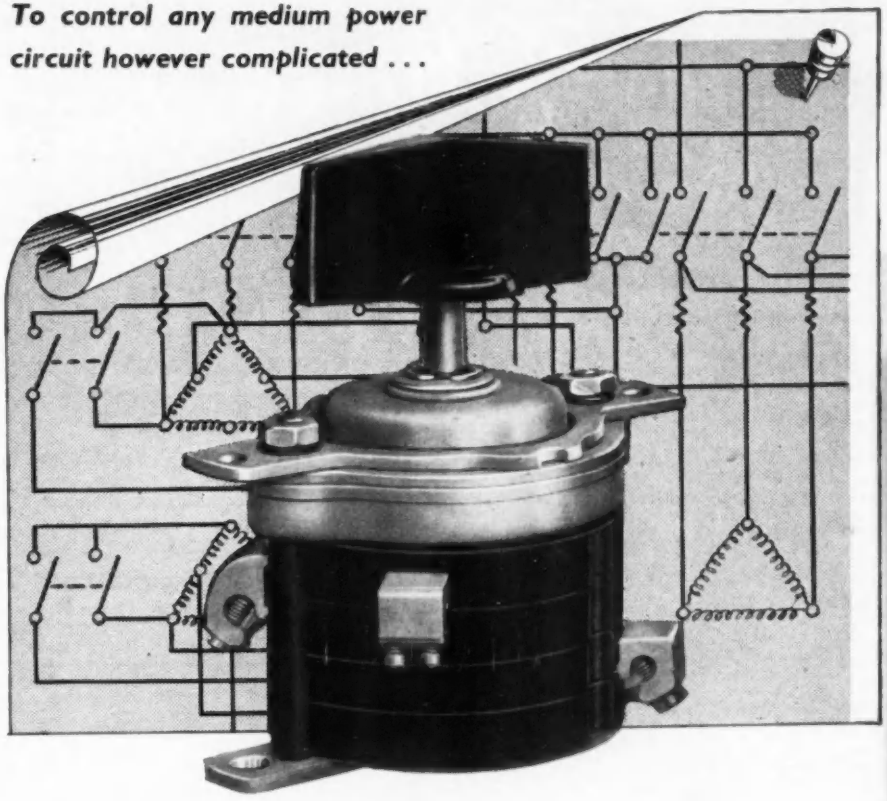

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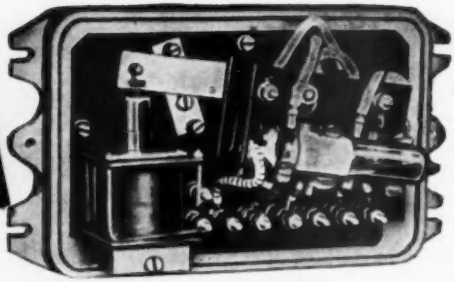

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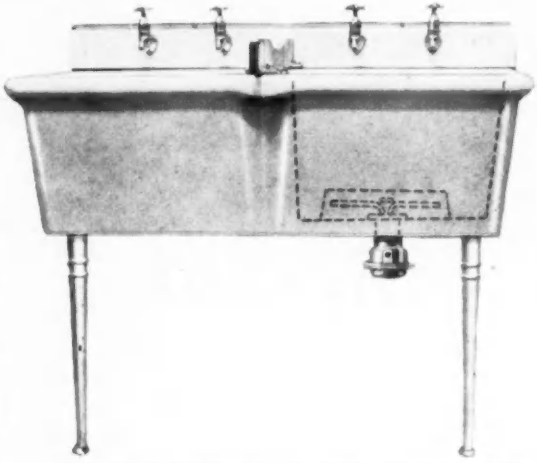

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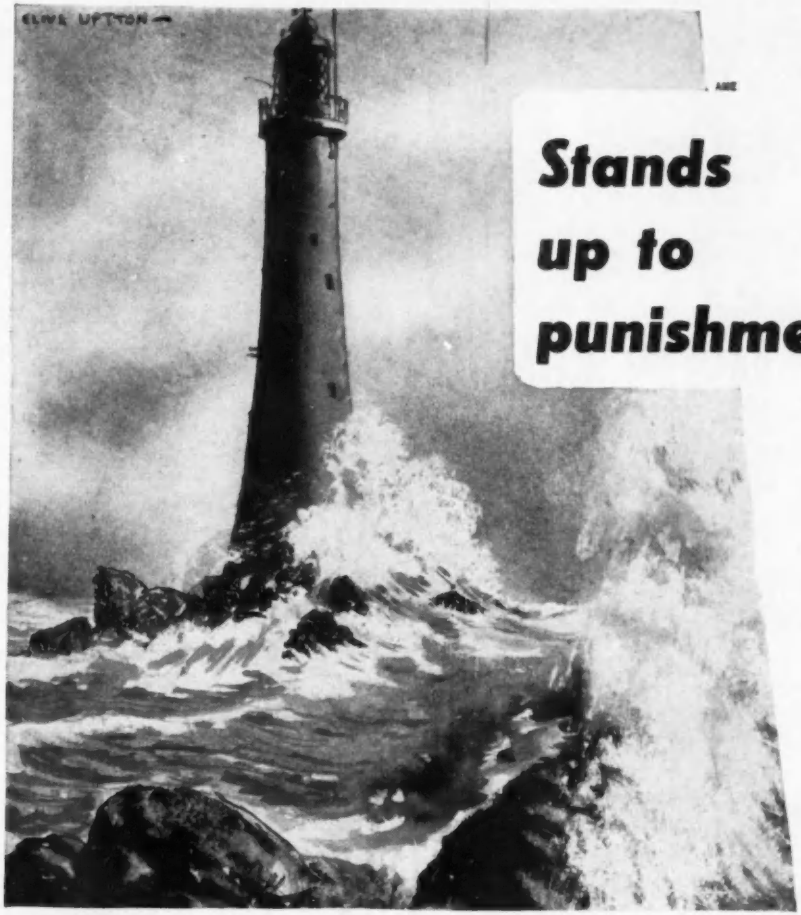

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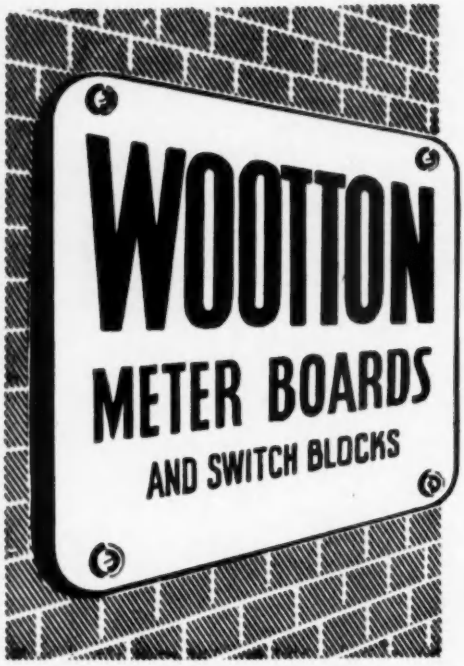

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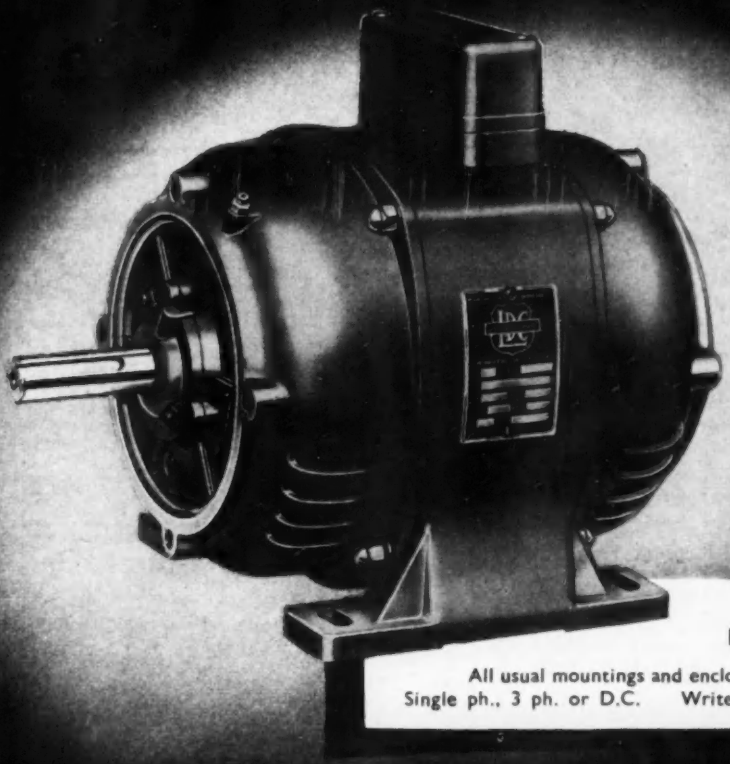

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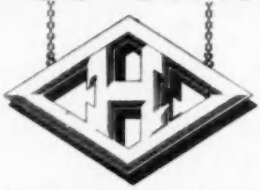

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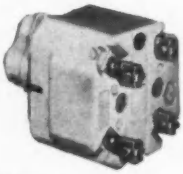

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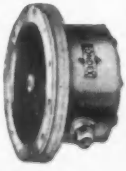

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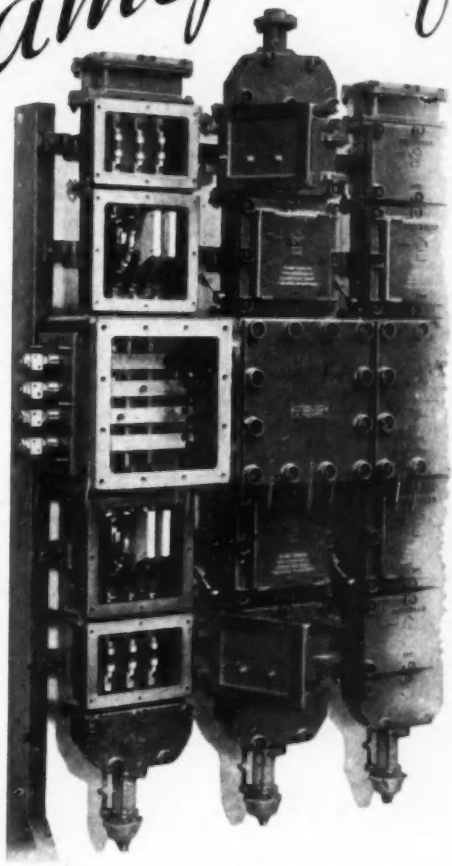

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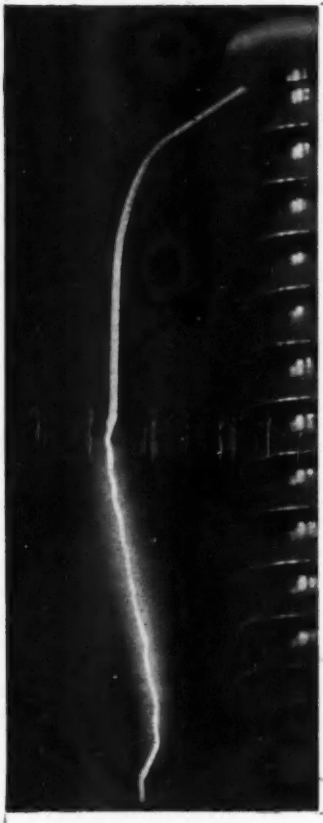

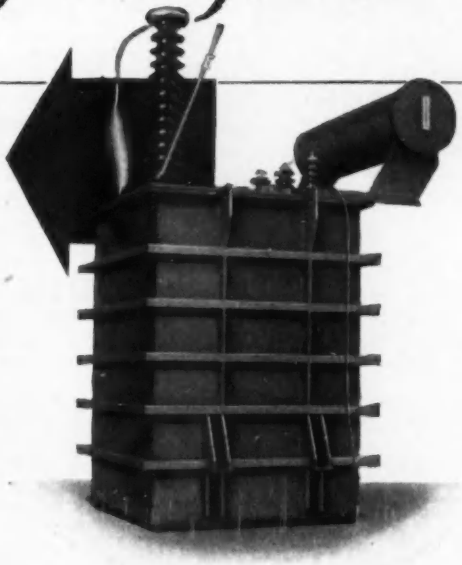

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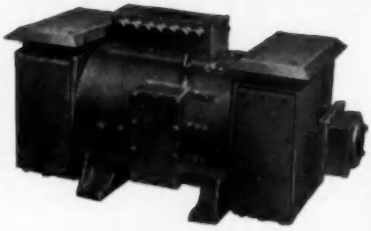

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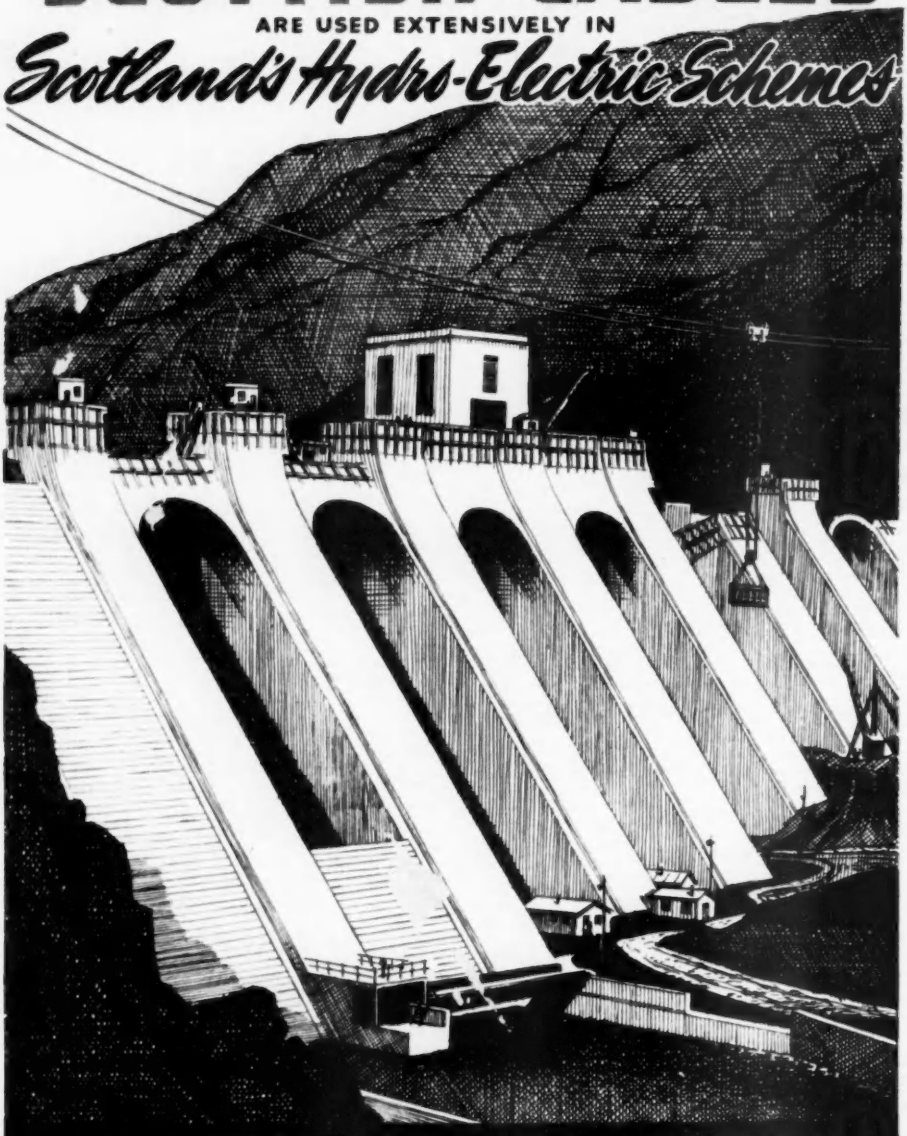

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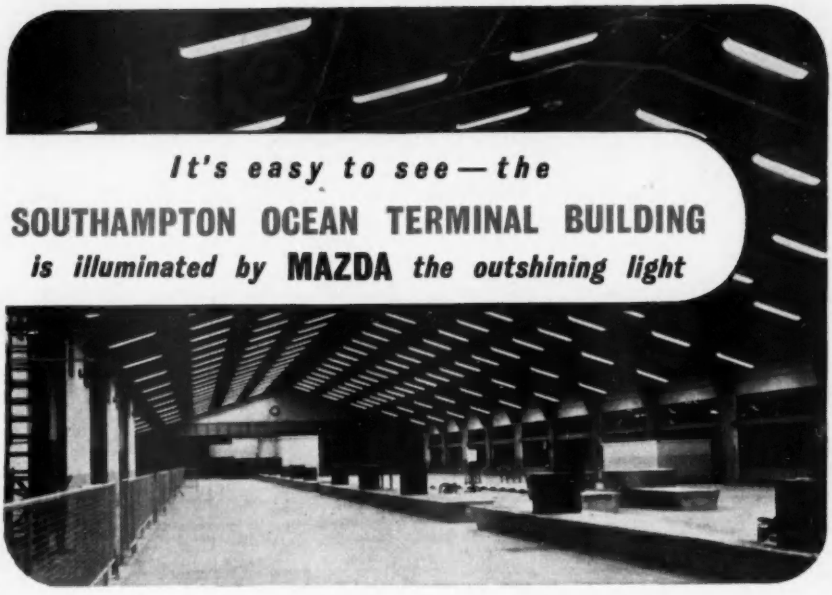

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